THE BOOK OF KNOWLEDGE

The Book of Knowledge

The Children's Encyclopædia

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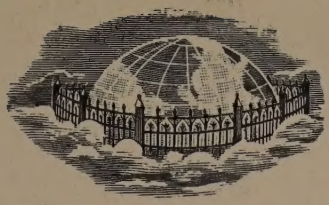

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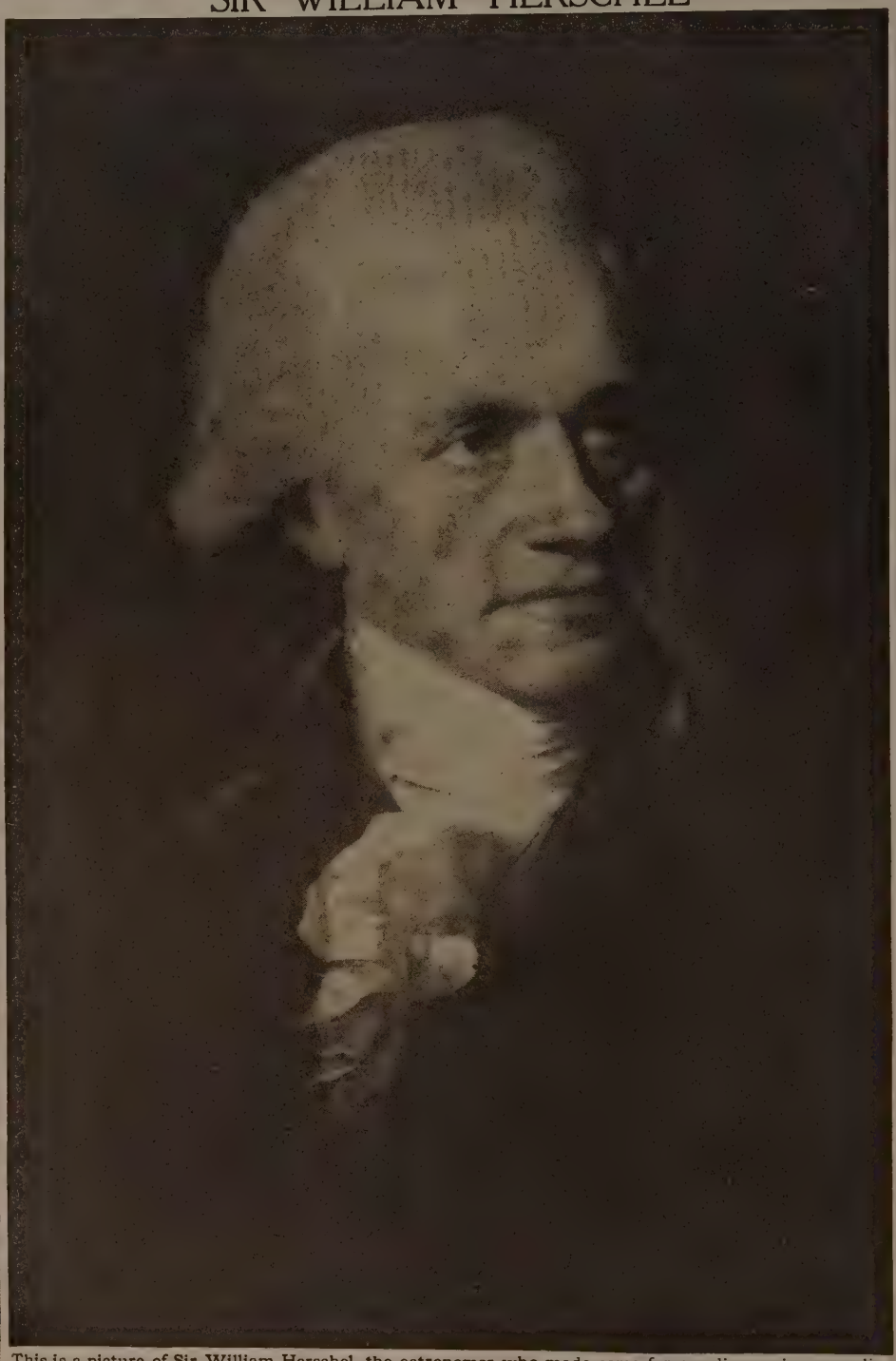
SIR WILLIAM HERSCHEL

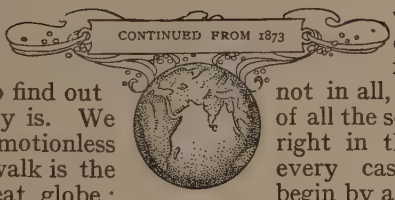


This is a picture of Sir William Herschel, the astronomer who made some famous discoveries regarding the planet Uranus. William Herschel was a poor boy, and it is possible that he might never have become the wonderful astronomer he did, if it had not been for the assistance of his sister, Caroline, who devoted herself to her brother, acting as his workshop "boy," looking after his instruments, doing his housekeeping, copying his papers and helping him with his studies. Caroline too became a famous astronomer.

ASTRONOMY

THE earth we live on is only one of many worlds that fly through space. If we are to understand our own world, we must learn about the worlds in the skies, which we can see but cannot visit. In these pages we begin the study of astronomy, the science of the stars. Though men have been "star-gazing" for many ages, it was not until about three hundred years ago that astronomy really began as a true science—just about the time when all true science really began. A Danish monk and two Italians, one of whom was also a monk, were the real founders of our knowledge of the universe; and the greatest name after theirs is Sir Isaac Newton's. These men have taught us that our own earth, and the sun it moves round every year, are only a tiny part of the great universe, which contains millions of such suns and planets, in all stages of their history. And now, armed with the telescope, which brings the stars nearer to our sight, and the spectroscope, which interprets the light of the stars, and the law of gravitation found by Newton, men are learning more and more about these worlds in the skies.

WORLDS IN THE SKIES



BEFORE we could get any right ideas about the earth we live on, we had to find out what this earth really is. We learned that this firm, motionless ground on which we walk is the cool outside of a great globe; and that this globe spins daily on itself, making night and day, and moves yearly round the sun, making the seasons. We had to trace the way in which men learned how to correct the evidence of their senses, which seem to say very plainly that the earth does not move, and that the sun does, and, then, when we knew what the earth really is, we could go on to study the stuff of which it is made, and the way in which it changes and *does things* from moment to moment.

Now, it is always true that if we are really to understand anything we must study not only the thing itself, but also what is around it. We cannot understand a part of any great whole, until we understand something, at least, of that whole. We cannot even understand ourselves unless we study the conditions of our lives, our parents and schools, what we read, the air we breathe, the things we hear people say, and so on. And in the case of the earth we can never hope to understand it unless we study the great world of which it is really a very tiny part. This study is known as astronomy—the word means *the law of the stars*—and it is in many ways, though not in all, the most marvellous of all the sciences. I think it is right in this case, as it is in every case, that we should begin by a very short history of men's knowledge of astronomy.

It is probably the oldest of the sciences. Men were always interested in the weather, in changes of climate, and in the sun, which plainly has so much to do with what happens in the sky around us. The sun and moon were closely watched by men, probably, before anything else at all. Also the stars are far more brilliant when they are seen through the clear air of warmer countries than ours, such as Arabia and Egypt; and as they seem to be fixed they can guide men on the sea and on land. Thus, astronomy was *useful* from the first, as it is useful to-day, though most of us have no idea how useful it is. So it comes about that we find proof of astronomical knowledge long ages ago, even thousands of years before the birth of Christ. This is specially true of the East, more especially of Western Asia and Egypt; but it is also true of Great Britain, for Stonehenge proves at this day that definite facts had been learned about the movements of the sun sixteen hundred years before the birth of Christ. This we learn by noting the way in which this ancient temple was built; and we find

that it was not only a temple for worship, but also an observatory for the observation of the sun, moon, and stars.

The names of most of the sciences, we know, end in *ology*, and we might expect the name of the science of the stars—using the word stars to include all the bright objects in the heavens—to be astrology.

THE ALCHEMISTS AND ASTROLOGERS WHO BEGAN THE STUDY OF THE EARTH

We use the word astronomy, however, to distinguish this real science from an unreal science which came before it, and which was called astrology. If we turn to the great science of chemistry we find exactly the same thing. Before what we now call chemistry came into existence there was an unreal science called alchemy—which is really the same word. The alchemists were searching for the philosopher's stone that was to turn everything into gold, and for the elixir of life that was to turn or keep everybody young. The alchemists were wrong in looking for these things, and they were wrong practically always in the way in which they interpreted the results of their experiments. But we could not have modern chemistry if there had been no alchemists. They were eager and patient men who made numberless experiments and noted numberless facts. They laid the foundation of chemistry, and though they were wrong in their objects, and wrong in their attempts to understand what they noticed, yet we profit in a thousand ways by their discoveries to-day.

And, just as every modern chemist is indebted to the alchemists, so every modern astronomer is indebted to the astrologers. We could not have had our modern astronomy but for them. They, too, like the alchemists, were eager and patient men, and they observed thousands of facts about the heavenly bodies.

THE STRANGE THINGS MEN THOUGHT LONG AGO ABOUT THE STARS

They were wrong in the way in which they interpreted those facts, but a fact is a fact for ever, and since it is part of truth, is a part of true science; nor does it matter, in the long run, that the man who observed it misunderstood it—whether sincerely or dishonestly. We find in the early history of every race and nation that we can trace a kind of astrology—that is to say, a study of the stars in the belief that they controlled the fates of men. Egypt and Persia, Arabia and Greece, the Chinese and the Hindoos all contributed to astrology, and so when civilisation began in Europe it took over these ideas from the first. They flourished for thousands of years, and even to-day we can buy for a nickel foolish almanacs which pretend to predict what will happen on the earth by studying the stars. The astrologers took those of the planets that they knew, and connected human characters with them. Venus had something to do with love, they thought; Mars with war, and so on. They divided up the sky into various parts, and supposed that when a certain planet entered a certain part of the sky corresponding results would occur for human beings, especially for anyone who was born just at the moment when that particular part of the sky happened to be going to rise above the horizon.

ERRORS OF THE PAST WERE THE PARENTS OF THE TRUTH WE KNOW TO-DAY

We know now that all this was nonsense; but it would be very foolish and vain for us to imagine that we would have thought so if we had lived in those days. One of the most difficult things in the world is for any of us to imagine how he would feel and what he would think if he lived in a world of knowledge and ideas very different from our own. We must not despise those who believed in astrology, nor fancy that they were very foolish compared with ourselves, or we shall find that we are despising some of the greatest men who ever lived. Kepler, for instance, who discovered the laws that govern the movements of the planets, and the great English philosopher, Francis Bacon, believed in astrology to no small degree. What those men were capable of believing we should certainly have been capable of believing if we had lived in their time.

Great men though they were, they knew nothing at all of many facts that we know well—facts many of which they discovered themselves. We are standing on their shoulders, so to say, and so, though we are small and they were great, we can see further and

THE LIGHT THAT HAS BEEN TRAVELLING SINCE THE SPANISH ARMADA

When we look up at the stars it is hard to believe that we are looking at the light from a star that may have ceased to exist a thousand years ago. Yet that is quite true. What we call the stars is the light flashed through space from stars millions of millions of miles away. Although light travels so quickly—186,000 miles in a second—some of the stars that shine to-night are so far away that the light we see may have left them before Jesus Christ was born. In this picture our artist has tried to help us to understand this in a simple way. At the time when the Spanish Armada went to England, a new star came into existence. Nobody saw it then, but our artist has shown it in the sky above the Spanish ships. That was 300 years ago, and the light from this new star has been travelling ever since ; yet it was only a few years ago, about 1900, that the light reached the earth. This picture shows a girl reading the story of the Spanish Armada to-day, while her brother looks up at the starlight which started on its journey about the time the Armada was sinking.

clearer than they could. Astrology lived on, and was bound to live on until astronomy was born. The error was the parent of the truth, and then the error had to die.

Of all the astronomical discoveries, one stands out as that which, beyond all others, destroyed astrology, and that was the discovery by Copernicus that the sun and not the earth is the centre of the solar system. We must remember, too, that in this case, as in every other, people will believe the false unless they know the true. So in our own time and in the future, wherever there are people who do not know anything about astronomy, they will believe in the rubbish that astrologers tell them. There is no real remedy for error but truth.

We have already learned that astronomy was useful from the first, and we should particularly notice the difference between the real use of real knowledge and the sham use of sham knowledge. The astrologists declared that the study of the stars was useful because it enabled them to predict what would happen to men—which is a thing that men always want to know.

How the Stars Guided the Traveller in the Early Days of the World

Sometimes they happened to be right, as anyone may happen to be who makes a prophecy, especially if he takes care that it is a likely one. But usually they were wrong, and so they were not merely useless, but worse than useless. Yet all through the time of astrology there was a certain amount of real astronomy known, and this was useful then as it is now. Especially was it so because observation of the position of the stars guided travellers, whether on the sea or on the land. Travelling has always been important, but there were no good maps in those days, and the compass was only known in China. The skies are almost always bright, however, in Egypt and Arabia and Greece, and so the stars could always be seen at night to help the traveller to his goal. Every ship that crosses the sea is indebted to astronomy to-day, and always will be.

But the thing we should notice particularly is the difference between the sham knowledge and the real knowledge—the worse than useless and the very useful. They both depended upon facts and upon the same facts—that such and such stars could be seen at such and such places at such and such times. But the sham knowledge with its bad consequences depended upon a false interpretation of true facts, while the useful knowledge depended upon a true interpretation of the true facts.

How Mankind was Cheated and Led Astray for Thousands of Years

The great lesson which we have to learn from this applies to all knowledge of every kind; whether we are studying stars or disease or the rocks or history or anything else, there are always two things which it is our business to find out. First comes the facts, and then comes the meaning of the facts. We must have the facts first, and we get these either by simply observing—as when men look at the stars, or by making experiments—as we do in chemistry. The facts are facts whether we understand them or not, and in any case we must have the facts first. After that comes the business of trying to understand what the facts mean, and if you do not know what they mean it is much better to say so and to go on looking for more facts, rather than to pretend you know what they mean.

We thank and praise the astrologers for finding many facts, but we cannot thank them, and are, indeed, bound to blame them, because they pretended to understand them when they did not, and because for thousands of years they cheated mankind with their pretended explanations. The astronomers of to-day ask money from mankind as the astrologers did, but they do not ask it in return for sham prophecies as to what will happen to you and me, but they ask it for telescopes and observatories, so that they may learn more about the wonderful world in which we live.

Brave Men who Suffered for Believing What All Men Now Believe

Our more definite knowledge of the history of real star-science begins with the Greeks, and we know that some Greek astronomers had discovered the true shape of the earth, the fact of its spinning and its revolution round the sun. Then these truths were denied and despised, and for many centuries men went back to the old view that the earth is motionless and flat, and that the sun goes round it, as it certainly seems to do.

IF WE COULD TELEGRAPH TO THE STARS

This picture helps us to understand the distance of the stars. A wireless telegram travels fast enough to cross the earth in a second, but it would take 2,000 years to send it, if we could do so, to the distant stars.

But in the sixteenth century there arose a great man, a monk, called Nicolas Koppernik, of Denmark, whose name we now know in its Latin form of Copernicus, and he proved again the truth that had been lost for nearly 2,000 years, that the earth goes round the sun, and that the other planets, such as Mars and Venus and Jupiter and Saturn, do so too.

His great follower, the Italian, Galileo, made use of the telescope. With it he completed the proof of the view held by Copernicus. He found that Venus has phases like the moon, showing that it goes round the sun in a path *inside the path of the earth*, and he found four of Jupiter's moons, showing that it was like the earth, which also has a moon. And so we learned to think of the sun and his family, the *solar system*, about which we have already read a little in this book. Galileo was finally after much discussion stopped and silenced by the Inquisition. He was made, under threat of torture or death, to declare that his discoveries were false. He was forbidden to teach any more, and the poor old man, alone in the world—for he had lost his beloved daughter—died miserable, alone and despised. But his glorious name will be revered and honoured by all men as long as mankind endures.

About the same time there lived a man, once a monk, like Copernicus, of Denmark, who saw farther and deeper than either Copernicus or Galileo, though he was not an actual discoverer with his own eyes. He was an Italian, named Giordano Bruno; and if you think of him as if his name were George Brown, you will realise that anyone, anywhere at any time, may make his name immortal. Bruno, or Mr. Brown, as we should call him now, was the first man to teach a new theory of the mighty universe in which we live, and so his work is of lasting interest to all men.

We saw what Galileo's earthly reward was; but Galileo sacrificed himself at least in some degree, by denying what he knew to be true; and so we cannot say of him that he was so completely a martyr for the truth as he might have been. *Martyr* really means *witness*, but we use the word to mean a witness who pays for his witness by his life. Bruno was attacked, as Galileo was, soon

afterwards. He, too, recanted, or took back what he had said, for a time; but afterwards something within him made him ashamed of doing so. He boldly declared again what he believed, and the Inquisition condemned him to death in 1600. Bruno, however, had broken his vows, and had advanced many strange ideas of religion, and the Church has always declared that he was punished as an unrepentant heretic and not as a man of science.

How Isaac Newton carried forward the truth

If the time is ever to come when the world ceases to misunderstand such men, it will be when children learn from their childhood upwards that nothing can stop the truth; that to fight against it is to fight against God, and therefore to be beaten at last; and that the only safe and wise and right course is to give an honest and reverent hearing to all sincere men and women, whether we think them right or whether we think them wrong. God will judge and decide in His own good time; and He has said: "Judge not, that ye be not judged."

Before we learn what Bruno taught the world, there is one other name which we must learn in the history of astronomy. It is that of an Englishman, Isaac Newton, who discovered the law of gravitation, by which the universe is balanced. This he did when he was 23 years old. When he published his discovery people said that he was wicked, and was trying to take away from the glory of God; but now all men honour him, and see that the more we learn about Nature the more we learn about the wonder and power of its Great Author.

The first man to understand that all the stars are suns

When Bruno read and thought over the work of Copernicus, there came into his deep mind the true view of what our universe really is. The first great truth he saw was that the sun—our sun—must really be one of the stars; and with that great idea in his mind he began to think of the other stars. So he saw that *if the sun is a star the stars are suns.*

Consider how tremendous is the meaning of that sentence, and especially of its conclusion: *the stars are suns.* Men had thought of the earth as the centre of all things, the sun as its attendant, daily moving round it, and the stars as little points of light—mere trifles, giving no useful light, and meaning nothing, unless that somebody would meet with an accident in a certain year, or that someone else would win a victory, if certain stars could be seen at certain times. And then Bruno came and taught that these little points of light were suns, like our own, perhaps vastly bigger and more important, and that probably there were planets circling round them with living creatures, perhaps as intelligent as men, or even more intelligent than men, upon them. This is the most humbling discovery to the pride of human beings that men have ever made, and it is also the grandest. Some thinkers and theologians had suggested it before but the world was not ready to believe them.

The earth is as a grain of dust in a mighty mass of worlds

The universe, then, consists chiefly of a vast multitude of stars, of which we can reckon not less than one hundred millions already. Of these our sun is just one, and certainly neither the biggest nor the brightest, though infinitely more important to us than all the others put together. Around any number of these stars there may be planets, perhaps with moons, circling as we do round our particular sun. And the whole of our earth is but as a grain of dust compared with the whole mighty mass of worlds which we can see on any fine night from the earth's surface.

As to the size of the visible universe, we learn similar lessons. The earth is quite small compared with Jupiter, the giant planet, and Jupiter is small compared with the sun. But if the whole space surrounded by the path of the outermost planet, Neptune, from the sun outwards, were one solid mass, a mighty ball in which sun and earth and Jupiter and all would be lost like drops of water in a lake—even then this great globe would be nothing in size compared with many of the objects we see in the sky, and the distance from boundary to boundary of it would be nothing compared with the distance from it to the nearest star.

THE LITTLE DOT WE LIVE ON

Our world is like a speck compared with the whole universe. There are so many stars that to count the stars we see and say that these are all the stars would be as if we were to count all the automobiles in America, and say that these were all the automobiles. And all the stars are suns! The sun is great enough to give heat to 2,000,000 earths like ours; yet this sun is one of the smaller stars, and millions of greater suns move round and round in space. In this vast universe is what we call the solar system, of which our earth is a part. This picture shows us the solar system and its place in the universe, and, though all the distances cannot be properly represented, the picture shows us what a mere speck of the created universe our earth is, and helps us to realise why the mind of man is utterly unable to conceive the grandeur and wonder of creation.

In looking at the sky, then, we must always remember the meaning of these tremendous distances between stars and stars, and we must not be deceived, as so many men have been deceived, by the apparently *equal* distance of a planet and a star beside it.

THE LIGHT THAT HAS BEEN TRAVELLING SINCE THE SPANISH ARMADA WENT DOWN

It is not merely that the planets—which belong to our little system—are nearer than the stars, but that, compared with the stars, they are at our very doors, while the stars are almost infinitely far away. Something happened to a star which we noticed about seven years ago, and much attention was paid to it. Yet we reckon that whatever it was really happened about when Queen Elizabeth reigned in England, and the light that then left the star only reached our eyes a few years ago.

Thus to the eye of the astronomer the bright points in the sky are of two utterly different kinds. All but seven of them—among these scores of millions—are suns, vastly far away, and many of them vastly bigger than our sun. But seven of these bright points, together with the sun and the moon, and the moons of the other planets that have moons, and a number of very tiny planets, perhaps as small as an American county, that can only be seen through a telescope, are parts of the solar system; they belong to us, they are close neighbours of ours, and have nothing to do with any of the stars among which they seem to lie.

Now let us make a list of the various things that make up the universe, and that astronomers study. First, we shall note down the things that make up *our* system; we shall think of it as a kind of sample of what makes up millions of other systems in the sky—only that they are so far away that we can only see the suns—or stars—of those systems.

THE THINGS THAT MAKE UP OUR PART OF THE UNIVERSE, THE SOLAR SYSTEM

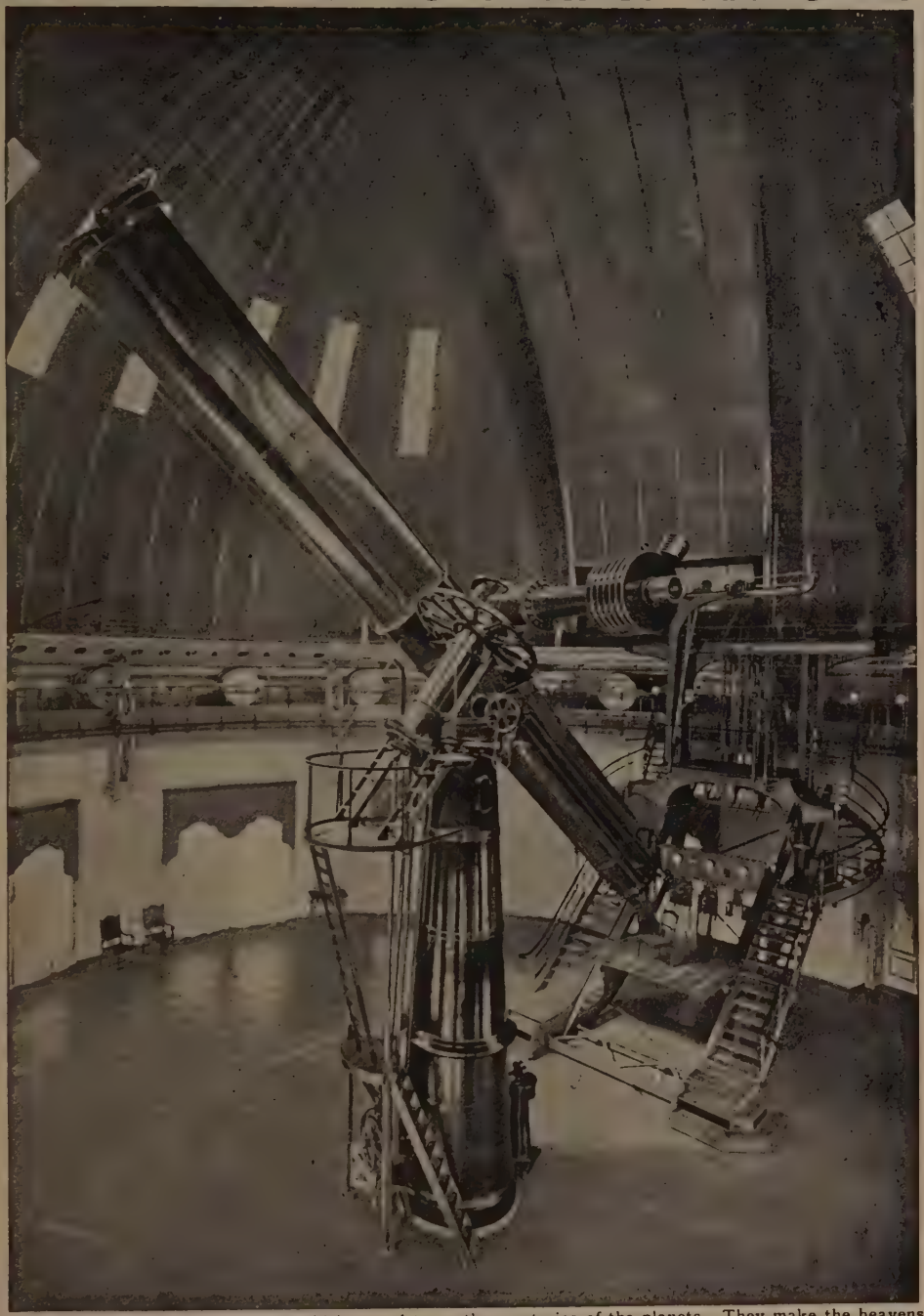
Our system consists of the sun; the eight large planets of which our earth is one; the moons of those planets; the minor or lesser planets, which all revolve round the sun in a sort of heap, in a path outside the path of Mars and inside the path of Jupiter; a large number of tiny things like stones and pebbles and pieces of rock, much too small for us to see, except when they are caught in our atmosphere and made bright, when we call them meteorites, or "shooting stars"; and a few curious things called comets, which also move round the sun and belong to our system. We ought really to learn this list. It is much easier to learn than a list of dead kings, most of whom could not read, and it is quite as important. The pebbles, the comets, and the minor planets are the things you are likeliest to forget. The names of the major planets we have learned already on page 150, and we certainly should learn them and their order outwards from the sun.

Again we must remind ourselves that several of these things may be seen in the sky, either with the naked eye or through a telescope, just as if they were stars, but they are really just about as far from the stars as we are, and belong to us. When astronomers discover a new minor planet—and there are hundreds of them known—they cannot tell whether they are dealing with a tiny little planet, perhaps smaller than Rhode Island, or a star that may be vastly bigger than the sun, until they find that it moves or wanders among the stars, and so is a planet, or *wanderer*.

THE GREAT DIFFICULTY OF UNDERSTANDING THINGS SO FAR AWAY

The difficulty people have in learning how utterly different Venus is from a star like Sirius is a difficulty that even astronomers have to reckon with, so great is the influence of distance in deceiving us as to the comparative importance of things. If someone breaks his leg next door we think it more important than if twenty thousand people were drowned by a tidal wave in China; and most people read the papers as if a murder that happened yesterday was a thousand times more important than the Crucifixion or the death of Socrates or Bruno. We must learn from astronomy that a very tiny thing may be taken for a very big thing, if only it happens to be near enough. We have all heard about Shock-headed Peter, who fell into a pond because he looked up at the sky instead of where he was going. Of course, he should have been more careful; but we should think better of him, or of anyone who values great and beautiful things that are far away, than of people who think of

ONE OF THE WORLD'S GREATEST TELESCOPES



This is one of the great telescopes which reveal to us the mysteries of the planets. They make the heavens seem so near to the eye that we know more of the planet Mars, for instance, than we know of some parts of our own world. In a modern observatory the floor is raised and lowered by hydraulic power, and the instrument is moved by heavy machinery to any position, though weighing many tons. Yet, though this instrument is so vast, it is so exact that only a microscope can show the slightest error in its mechanism. Any boy or girl may have a simple telescope, but a telescope like this costs a fortune to make and to maintain and may take years to complete. Nineteen times the makers failed before they could make a perfect lens for the Lick Observatory telescope. An early telescope was made by Galileo, of whom we read on page 1658, but Galileo never looked through a telescope which brought the wonder of the heavens so near to man as this one does.

nothing but what is around them, and think that a gas-jet is brighter than all the stars. It *is* brighter to our eyes; but the eyes of our minds should know better.

We can never know any other of the millions of solar systems as we know our own, but whenever we look at a star we must think of it as Bruno thought of it, and remember that it is probably *the sun* to other planets, and perhaps to intelligent beings not very unlike ourselves. But in the universe, outside the little limits of our solar system, there are many other things besides stars, and we know what these various things are. Then, when we have got firm hold of the right idea of the universe and what it is made of, we shall be ready to study some of these wonderful things more closely.

We discover in the heavens, apart from our small system, many bright stars. Without seeing them, but in other ways, such as by noticing how they disturb the bright stars, we discover also many *dark* stars; stars that have grown cold and "gone out."

THE COUNTLESS NUMBER OF STARS IN THE SKY AND THEIR MANY KINDS

A well-known astronomer, Sir Robert Ball, has said that to look at the bright stars—the stars we can see—and say, "These are all the stars," would be like counting all the *red-hot* horse-shoes in England, and saying, "These are all the horse-shoes." The bright stars are probably very few compared with the dark ones. Bright stars and dark are of many different kinds, but we shall read about them later. Here we must remember both of them as helping to make up the mighty population of the skies. And after them we must put down the names of the *nebulæ*. Nebula means *cloud*, and *nebulæ* means *clouds*. The nebulæ are things which *look* like tiny clouds among the stars. We have already learned that the solar system was made from a nebula; and we believe that all the stars, and the systems of which they are the suns, were also made from nebulæ.

There are many stars in the heavens which seem to be still only half-made—still more "star-mist" than star—and these we call nebulous stars. On page 1949 is a photograph of the great nebula in Orion, in which six stars can be seen to have already condensed. You can see Orion for yourselves in the early winter evenings in the south, and the picture on the opposite page will show you which is the nebula. To our naked eyes it looks like a star—the middle star of three forming the dagger of the huntsman which the ancients thought Orion looked like.

It is almost certain that there are dark nebulæ as well as bright ones, and that we must therefore remember both kinds as we remember both kinds of stars.

THE MYSTERIOUS JOURNEY OF A COMET THROUGH SPACE

There are also in the heavens many comets besides those that belong to the solar system, and go round the sun as regularly as the earth does. A comet is quite a small thing, really, and requires to be near to be seen. Even the comets that belong to the solar system can only be seen occasionally—astronomers have been recently looking for the most famous of them all—when they come comparatively near to the sun. The comets in outer space cannot be seen. But we know that they are there, since some of them occasionally visit us. After rushing through space for the vast distances that stretch between star and star, they may visit *our* star, the sun, and after rushing round him may fly away again into space and be seen no more—by us. Astronomers know that these comets do not belong to the solar system, and will never return, as the paths they pursue are not *closed* paths, like a circle ○ or an ellipse ⬭, but open ones, like this ⊃, which carry the comet through space, perhaps never visiting the same star twice, until its history ends in its breaking up into little parts like the stones we call meteorites.

THE GREAT INSTRUMENTS THAT HELP US TO READ THE SKY AS IF IT WERE A BOOK

These, then, are the various kinds of thing that astronomers have to study. In doing so, there are certain means that greatly help us. The first is an instrument of the mind—our knowledge of the law of gravitation. Everyone knows that something pulls objects towards the earth so that, if unsupported, they will fall. It was left to Newton to show that the moon has a similar relation to the earth, and that the earth and all the other planets are ever tending to fall

towards the sun. It was said, only about sixty years ago, that we should never really know whether gravitation is true outside the solar system—whether it is at work among the stars. Yet we already know that it is at work among the stars, and we believe that it applies everywhere. Our knowledge of this law is used in all our study of astronomy, and is always the instrument that leads us to fresh knowledge—a great proof of its truth.

Then we have two great instruments of another kind. The first is the telescope, which shows us the heavenly bodies, and helps us to trace their movements. The second, much newer, is the spectroscope, which sorts out the light they send us into its various colours, and so enables us to say what the heavenly bodies are made of. Thus we can prove that hydrogen and iron and calcium and carbon and oxygen, and many other of the elements we know on the earth, are in the stars and make them up. This is in itself one of the most important and wonderful discoveries ever made. As we have nothing but their light to study the stars by, and as we can already study that light in fullest detail, the future will probably never give astronomers any other instrument more valuable than these; but it is best not to be sure when we say what will not be possible in the future.

This is the constellation of Orion, which shines brightly in the south in winter evenings. It is due south shortly after midnight in January, and earlier in February and March. The nebula is the middle star of the three which form the dagger of the huntsman whom the ancients thought the constellation resembled.

We shall now begin to study the different kinds of heavenly bodies. To begin, we must describe them. We must look at the sun, find what he is made of, how he gives his light, what his spots are, whether he has an atmosphere. We must study the moon, our nearest *constant* neighbour in space—though comets and meteorites come nearer occasionally—and we must learn from the moon what the earth will become at some distant date. We must look as closely as possible at the planets, especially at Mars, which is so much like the earth in many ways, and is, indeed, so near that we know more about its North Pole than about parts of our earth. And when we have learned all we can about the solar system, not because it is necessarily the most important or wonderful of such systems, but because it is the only one we *can* study, we must look at the stars and describe the various kinds of them, hot and cold, "calcium stars" and "hydrogen stars," single stars and double stars, nebulous stars, variable stars, "fixed" stars, and so on.

And after all this we must remember that the description of a thing is not the same as the explanation of it. This is true of a small boy, or a mighty star, or anything else. We must try to explain, as far as we can, the history and the making and the fate of the stars, the reason of the Milky Way, and the meaning of the whole. We shall not be able to answer all the questions that will come to us, but we must do what we can; and though it has often been said that men were not meant to study these things, we shall find that the more we learn the more wonderful and splendid do we find God's work to be.

The next part of this is on page 2081.

GRACEFUL BIRDS ON LAND AND WATER

Darters perch and nest in trees although their feet are webbed. They swim and dive most wonderfully

The purple heron is a very slender-necked and graceful bird. Here we see its nest made of leaves of reeds.

The pelican is an ugly bird on land, but it is graceful in the water and flies beautifully. It is an expert fisher.

Water-hens make nests of matted vegetation in lonely ponds and streams. They swim and dive, and run swiftly over the fields and moors.

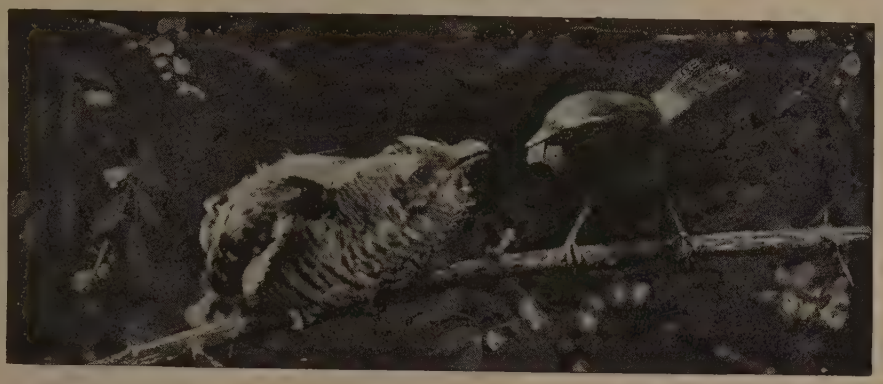
The coot is like the water-hen, but it will not eat young birds, as the water-hen does. Its food consists of vegetable matter and fresh-water shellfish.

The night-heron is like an owl in its habits. It sleeps away the day and searches for food at night, coming out when other birds go to bed.

The Goliath heron is the giant of his family. Here we see him in his plumage for the courting season.

The common heron is about three feet high, and may be found East and West and also in far-away countries.

The egret is killed while rearing its young in order that cruel or thoughtless women may wear its plumes.



BIRDS THAT SWIM AND CLIMB

CONTINUED FROM 1848

As we have so often seen, wherever there is food to be had, there Nature has placed the creatures best fitted to benefit by it. We have learned from the story of the sea birds what great numbers of feathered hunters live upon the products of the ocean; but there are many sorts of birds which owe their life to the food contained in the fresh water, in the rivers and lakes and marshes. Sea birds may come inland to feed in rivers and in fields, but many of these fresh-water birds never go to the sea for their food, any more than fresh-water fish go out into the briny ocean for theirs. Yet the difference between some of the fresh-water birds and some of the sea birds is not very great.

After studying the habits of the skilful cormorant, we should, if we saw a long-necked, long-beaked bird fishing in an African river, very likely exclaim, "There is a cormorant!" But a naturalist would at once point out the mistake. Our new friend has a very long neck, it is true, but it is thicker than that of the cormorant. Besides, its beak is sharper, and looks like a small spear; and that is just the purpose that it serves.

The bird is a darter, and, though its feet are webbed like a duck's, this bird builds in the trees of great forests, and hunts by night in the rivers and lakes and swamps near at hand.

It is a splendid swimmer and diver, but does not rely upon its speed in swimming nor its ability to dive for getting its food. Experience has taught it that it is not safe to hunt by day, so it comes out when the sun is going down, and seeks its food in the gloom. Even this precaution is not enough. It does not like to expose itself on the water; it sinks its body beneath the surface, and glides along with its great wings partly open. Only part of its neck and beak are visible above the water. At the least sign of danger it sinks still lower, and only its bill is to be seen. Should danger still threaten, down the darter goes entirely under the water, to come up far away in a place where we least expect it.

But when all is quiet, the bird goes very cleverly to work. When it espies a fish, it makes a sudden dart with its closed beak, and drives this right through the body of the fish, fixing it as with a spear. Then the darter comes to the top of the water, and a wonderful formation of the bones of the neck enables it to give its head such a jerk that the fish is thrown off the beak to be eaten in comfort. In India the darter nests in company with cormorants, and, like these, can be tamed to travel with boatmen.

That trick of sinking under the water to escape detection is not known to the darters only. We may see it perfectly carried out by our own handsome little water-hens and coots. The water-hen's feet are thinly webbed;

those of the coot are not, but its toes each have a lobe of membrane on both sides, so that the same effect for swimming is gained. Water-hens, which we Americans call mud-hens, and the coots are common in England. They are to be found in most parks where there is water; but the greatest joy is to find them ourselves, wild, in their own homes.

A FAMILY OF COOTS IN A LITTLE STREAM IN ESSEX

Only a little while ago a lady and two gentlemen took a canoe up a small stream in Essex, quite near a good-sized town. The little river flows through the town and turns the wheels for a lot of machinery. Then it passes quietly along its bed, through a dense growth of trees and plants, and on into the open to turn the wheels of a water-mill. Now, so close were the trees that to get their little boat along our party had to cut their way through the branches that met across the stream, and they came upon a stretch of water as quiet and peaceful and beautiful as if it were a thousand miles from London. To their delight the friends, keeping very quiet, saw two or three big coots and their babies.

The friends paddled quietly along the stream to get a nearer view. The little coots scuttled into the bushes at the side of the stream, and hid, but their baby cries could be heard, like the cheeping of tiny ducklings. This greatly alarmed the mother of one of the broods. The father bird flew, beating the water with his wings and making a great chuckling in his fright. The mother bird stayed near to draw the visitors away from her babies. She swam away from where the nest was, dived under the overhanging root of a big tree, then disappeared as if a conjurer had held her.

HOW A MOTHER COOT HUNG IN THE WATER AND COLLECTED HER BABIES

Instead of a coot there remained to view only something like a little yellow leaf and a tiny red one, which seemed to have drifted into the water. That pink "leaf" and the yellow one were really the mother coot. She had sunk herself in the water under the root of the tree, and only her little yellow beak, with its small red crescent, remained above the water. And there she hung in the water, as still as a mouse. The people in the boat drifted near enough to see the body of the bird deep down in the water, then they drew quietly and slowly away to a distance, and had the happiness of seeing her collect her babies together and sail off to her nest in the root of a tree growing down to the water's brim. Had she been seen on the land the brave little coot would not have had to hide; there she can run through the grass and reeds with the speed of a young deer. Water-hens and coots never do any damage. They eat insects and vegetation. But they have many enemies. Pike, the great hungry fish, often eat their young ones. And, of course, the men who call themselves sportsmen kill them as they kill everything that can swim, run, or fly.

America, as well as the warmer parts of the Old World, has pelicans wherever there are extensive marshes. In Florida they dwell in great colonies on certain islands where they are safe; and in the Far West throng about the prairie ponds and marshes, and nest on the shore.

THE PELICAN & THE ADJUTANT, THE MOST COMICAL-LOOKING BIRDS IN THE WORLD

The pelicans and the adjutant birds are the most comical-looking creatures in the whole bird family. The pelican is as large as a swan, has white feathers tinged with red, while the breasts of the old ones are yellow. The breast feathers end in narrow points, and all the plumage is very coarse. But the remarkable point about the pelican is its beak. The upper mandible, or jaw, is long, large, and flat, and has a hook at the end, which curves over the lower jaw.

The lower jaw has attached to it a great pouch, which the pelican can make very small when empty, or so expand as to carry all the fish which it catches in the course of a hunt. This pouch is compared to a bag-net, and that is what it is—the pelican's bag-net. When the pelican goes into the water of a stream or lake, it catches all the fishes it can, but does not swallow them; it simply carries them in the big pouch of the lower jaw. When it reaches the land it can eat the fish at its leisure. But more important is the fact that from this pouch the pelican can feed its young ones. The

QUAINT BIRDS OF THE STORK FAMILY

This is the bittern bird, whose cry sounds like a deep booming. It is very seldom seen during the daylight

This is an ibis. Long ago ibises were very plentiful in Egypt, and the Egyptians used to worship them.

This adjutant stork looks like a comical old soldier as he struts along with military stride, clapping his beak.

The white stork is a beautiful and intelligent bird, and loves to be near human beings who are kind to it.

The marabou stork is another species of adjutant. Here we see the curious position in which they sit to rest.

The boatbill does not look much like an adjutant, but, being a heron, it is related to all the storks.

little pelicans pop their bills down the mother's mouth and take out as many fish as they need. Although so big and awkward on the land, the pelican flies nobly, and the sight of thousands of these birds flying together is a picture never to be forgotten.

There is a whole family of large-billed birds which are famous as fliers. This is the great heron family, which has many members all around the world. They are birds with small bodies, from the size of a goose down to that of a pullet or crow, and with very long, unfeathered legs upon which they can wade in the water, and long, curved, slender necks, with which they can reach down and snatch up a frog or lizard from the shore, or seize a fish swimming about their feet. They are usually dark blue or greenish, or pure white, and most of them have plume-ornaments of some sort about the head. The larger kinds are nowhere very common, since swamps have been so much drained in this country, and so many persons with guns are about, but the small blue and green herons are to be seen on every wood creek, and flying over every pond. Some persons confuse the heron with the crane, but that is a very different kind of wader.

THE HERON AND ITS STRANGE HABITS OF LIFE IN WATER AND IN TREES

In England some friends of the heron protect it, so that it may build in safety; but, since hawking went out of fashion, the heron has gone out of fashion, too. It was at one time the custom to fly hawks at herons, as we have already read; and it seems rather cruel that, now that the bird does not serve for sport, it should be no longer wanted. Of course, it has its faults. It eats a great number of fish in the rivers and lakes which it frequents. It eats the young of other birds, too, and that seems excuse enough to make every man with a gun its enemy. Nobody seems to take into account the value of its work as a destroyer of snakes and rats and mice.

Herons are birds of singular habits. Half their lives are spent in the water, where, on their tall, stilt-like legs, they wade about looking for food, or calmly sleep, standing on one leg like a bird on a perch. Only at breeding time do many herons meet together. Then they make their nests at the top of tall trees. Where they are safe, herons return year after year to the same nests. In India herons are tamed and kept about the houses. That, however, is not their only purpose. Natives practise horrible cruelty to the birds. They make them stand about on boats and on heaps of wood in the water. Wild birds, seeing them, come down to the same spot, thinking that what is safe for herons must be safe for them. The decoy birds stand as motionless as statues. The reason is that they cannot move—they have had their eyelids stitched up by the savages who own them.

THE BEAUTIFUL WHITE EGRET WHICH IS CRUELLY SLAIN FOR FASHION'S SAKE

The largest heron is blue, with a black crest, but with white on the head, face, and breast. A heron which fishes by night is purple; but another heron, called, from its great size, the Goliath heron, has nearly all the colours of the rainbow scattered through its beautiful plumage.

A very large but slenderer heron is pure white. This is the head of the family of egrets, a name made only too well known to us all by the cruel women who wear the plumes of the lovely little egret as trimming for their hats. We can all understand how wicked it is to take these plumes when we know that the egret never has them except at the time that it is laying its eggs and hatching them. Thus the poor birds are killed outright or plucked and left to die while the babies are in the nest, where they, too, must starve and die.

The purple heron is not the only night-bird of the family. There is one, a small one, called the night-heron, from the fact that it sleeps away the day and devotes all the night to searching for food. They are not too lazy to go out in the daytime when their young ones are hatched, but night work suffices at other times.

THE BITTERN BIRD WITH THE BOOMING VOICE

In the same line as this bird come the bitterns, birds with a booming voice, which are common in this country wherever large marshes abound. It is smaller than the true herons, and has a shorter beak. But that beak is a fine spear, and when the bird is attacked it uses this with great force, and can cause a serious wound. Not only does it

thrust hard with this spear; it can use its beak as quickly as a kiwi can use its horny feet.

The most curious of all the herons we leave to the last. This is the boatbill, a name given because of the extraordinary shape of this bird's great broad beak. It lives in South America, and, as may be guessed, uses its curious bill as a shovel. Of all this wader family, the most interesting, perhaps, is the European stork.

Never having seen any storks in England except in captivity, two Englishmen, when they went to Holland the other year, thought that they would have a chance of seeing these fine birds in all their glory. But they had not looked at their bird calendar. Storks are like time and tide—they wait for no man. The birds had flown before the Englishmen reached Holland—flown to their winter quarters in Africa.

A STORK'S NEST IN A BUSY CITY

It is a glorious sight to see them flying. Big as they are, and strange as it seems to see their huge legs trailing out behind them like stiff tails, the storks, like the cranes and herons, fly magnificently, high up, and at night. Astronomers watching the moon and stars through telescopes are surprised to see a swarm of these noble birds suddenly come into their field of vision, so high in the air that the human eye could not, in the darkness, detect them.

In the spring the birds come back to Holland and many other parts of Europe, and people know of their coming long before they can see them, because, although the eye cannot trace them, the clap-clap-clap which the birds make with their great beaks travels down to earth. They know where they are welcome. The French people do not like them, and kill them when they can, so only a few storks, and those the unwise ones, go there. But in Germany and Holland and Denmark they go in swarms. The people put great boxes on their roofs for them, and there, year after year, the birds make their homes for the summer, laying their eggs and rearing their young. No other bird is fonder of its little ones than the stork, and that is why kind-hearted people are so good to them. Beautiful stories are told of the affectionate nature of the birds.

Once a female stork could not attend the great gathering at which the storks all muster before they take their flight to Africa. Her mate went, but she remained behind and spent the winter in Europe. In the spring her mate returned, and they built their new nest in the old place and reared their young ones. The same thing happened that autumn. She stayed, and he went, and returned again in the spring, and the next autumn away he went again. After he had been away alone for three years, he stayed with her, and for the next three winters they remained together far from sunny Africa. Then by some accident they were both killed, and it was discovered why the mother stork had not gone away with the father stork. She had been injured in such a way that she could not make the long journey, and that was why he had in the end stayed with her.

While in Europe storks are perfectly at home. They depend largely for their food upon supplies from the streets and markets. They gobble up the waste from fish in the public markets, and are highly valued as scavengers in this way and for their use in destroying rats and mice and reptiles which would otherwise be a nuisance.

In India the stork that the natives most highly value is the quaint-looking adjutant, which, with its five feet of

height and its wings measuring fourteen feet or so across, is equally at home on land or in shallow water or in the air.

It eats waste food in the streets, which in that hot climate would speedily cause illness to human beings. The adjutant is far from a beauty, but it is such a friendly fellow that it is often tamed and kept about houses.

THE QUAINT-LOOKING STORK THAT CAN SWALLOW A LEG OF MUTTON

One gentleman in India had an adjutant which used to stand behind his chair at meal-times and take more than its rightful share of the food. The servants were instructed to keep a sharp look-out for Master Adjutant, but his huge beak was often too much for them, and once he seized and swallowed a whole fowl. As the adjutant can swallow a full-sized cat or a leg of mutton, naturally a chicken would only be a delicacy to him. Ugly as the adjutant is, he has a relative in the marabou stork which gives highly valuable feathers. The marabou is a native of Africa. One of the singular features of the adjutant is a queer pouch which hangs down from the base of its neck. It can be closed or expanded at will, and it is supposed to have something to do with the bird's breathing.

There is not a more famous stork than the ibis, which in Egypt is called the sacred ibis. In body it is not much bigger than a fowl, but its long, powerful legs, its big head and long, curved beak make it quite a big-sized bird. There are over twenty species of ibis, of which the greater number belong to the Old World, and the remainder to various warm parts of America. But it is of the sacred ibis that we generally think when the name is mentioned. It is not clear whether the bird used to go to Egypt voluntarily, or whether it was captured in another part of Africa, and taken there to breed in captivity.

THE IBIS, WHICH WANDERED FREELY IN PHARAOH'S FAMOUS TEMPLES

This is one explanation given by naturalists, but it seems hardly a likely one, for there were thousands upon thousands of these birds in old Egypt. The ancients worshipped the bird. They thought it was favoured by their gods. Nobody was allowed to harm it. The ibis was protected and fed, and allowed to wander in the temples.

It is probable that the birds went there naturally. They would go when the Nile rose, for then there would be plenty of food for them. When the Nile went down, the birds would go away to other parts of the African continent. Now, when the Nile rises, the Egyptians are happy, for the waters bring fertility to the parched fields; without the rising of the river crops could not grow and men could not live. So they would think that the coming of the ibis and the rising of the river were events belonging to each other, and that, no doubt, is why the bird would gradually become regarded as sacred. When the Romans conquered Egypt, they found the land teeming with ibises, and carried many of them to Italy, where the birds bred and flourished. When the Egyptians disappeared, the ibis disappeared with them, and the bird is no longer seen alive there now, except at rare intervals.

THE BIRD WITH A BILL LIKE A SPOON AND THE BIRD WITH A NEST LIKE A HOUSE

Nearly related to the ibis is the American spoonbill—a bird which can be recognised as a member of the family, but armed with a strange bill, broad like a spoon at the end. Another very remarkable stork is the African whale-head—a long-legged bird with a huge beak, which is among the most shy of the species. Not the least interesting is the hammerhead, which seems a connecting link between the storks and the herons. Its build resembles both birds, but it possesses a voice which neither a stork nor a heron has.

Its nest is a wonderful structure, built high in the fork of a great tree or in a cleft or rock. It is built like the lodge of a beaver, so strong that it will bear the weight of a man. It is divided inside into a sort of reception-hall and an assembly-room, while over these is the sleeping-chamber. When the young grow too big for the nest, they live in the larger room, and the hall serves for a look-out chamber. There is only one entrance, and that is made small and well hidden, and the birds have to creep in. This bird lives only in Africa, and is uncommon.

There are two types of birds which seem to come in between the cranes and storks. One is the seriema, a splendid South American bird, which some naturalists believe to be a sort of

CRANES & STORKS & THEIR RELATIONS

Here we have what looks like a big shoveller duck. It is the spoonbill heron, a near relative of the ibis.

Long ago we had swarms of cranes in many parts of our country, but now they are only to be seen in the far west.

The crowned crane is the handsomest of the family. The crown consists of a crest of bristle-like feathers, and gives the bird a striking appearance. These birds live in Africa, and collect in swarms, as we see here, to strut and swagger, to spread out their strong, handsome wings and show their gay forms to their mates.

The seriema is a puzzle bird. Whether it is a sort of vulture, or a bustard, or a rail, men cannot quite agree. It lives in Brazil, the home of many beauties.

The hammerhead is supposed to be descended from the first parents of the storks. It builds a huge nest, strong enough to bear the weight of a man.

secretary bird. The other is the trumpeter, which looks like a very tall guinea-fowl. Its name suggests its special feature, which is its voice. Its peculiar windpipe enables it to utter a blast like a trumpet, lasting for a full minute. The Brazilians tame it, and it makes a splendid "watch-dog" for their poultry.

CRANES THAT DIE OF SORROW AND RAILS THAT RUN WITH MARVELLOUS SPEED

The true cranes have an advantage over the storks and herons in that they have a powerful trumpet-like voice, and their loud calls may be heard as they sail on high through the air on their annual migrations. There are sixteen species of these birds, the handsomest being the gorgeous crowned cranes of Africa. The sarus crane of India is one of the most affectionate of birds; and if one of a pair dies, the other feels such sorrow that it pines away and dies.

It is believed that all the birds called rails descended from the same stock as the cranes. Most of the rails have long legs for running, and have run so well that many species have almost lost their powers of flying. We have read already of the weka rail of New Zealand. Our common sora rail is a relative of this bird. The corncrake is another bird whose harsh, rasping cry is heard in British cornfields. It runs with marvellous speed and lightness through the corn, and is very seldom seen, near though it appears by its voice to be.

One of the birds which used to be grouped with the storks and herons is the flamingo. It is a beautiful bird, with the slender neck and long legs of the family, and with a big curved beak which it turns upside down in the muddy water to act as a dredge. When its beak is full, it sifts away the mud and water, and feeds upon the insects in it.

THE FLAMINGOES THAT LOOK LIKE ISLANDS OF RED ROSES IN THE WATER

The Persians call the flamingo the red goose, and the bird really does belong more to the goose family than to the herons. Although it is a wading bird, the flamingo swims beautifully. To see it fly is one of the sights of a lifetime. As they stand in the water at rest, in flocks of thousands, the flamingoes look like huge rosy islands or masses of tinted snow, but when they rise into the air and expose their ruby wings, they look like gorgeous clouds floating in the sky.

The flamingo on its nest is a curiosity. The nest is a high mound of mud, shaped like a basin. In this the bird deposits its eggs, and sits like a resting swan, with the neck gracefully coiled away among the back feathers, and the long legs doubled and showing far beyond the tail. Flamingoes are now very rare in Florida, but they are to be seen in vast swarms in Central America, and in various parts of the Old World.

Before passing from the wading birds, we must notice the curlews and whimbrels. These belong to a family of birds which we may see on the seashore in winter, and on the moors in summer. In the same family are the snipe, the sandpiper, the avocet, and stilt. The latter is practically a plover on stilts. The avocet is a similar bird, but its long, thin beak curls upward in startling fashion. The stilt resembles also another curious bird, the oyster-catcher, which has a long beak, so designed that the bird can easily take out an oyster from its shell. The beak of the curlew is like that of the avocet, but it curls downwards instead of upwards.

THE JACANA BIRD THAT WALKS ON THE WATER-LILIES, AND THE CRUEL CUCKOO

A near ally is the jacana, which walks on the water, or, at any rate, on the broad leaves of the lilies growing in the water. To enable it to do this, it has the most remarkable feet in birddom. The toes are long and thin, like fine-drawn wire. There are ten species of these birds. One has a head like our water-hen. Another has long, streaming tail feathers, which makes us call it the water pheasant. At certain times we may see among the sandpipers birds much resembling them, which, however, are different. If we could closely watch them we should see a great change come over them. The males grow frills of feathers round their necks, and become like new birds. These are the ruffs; the females are the reeves.

Leaving the water birds and their relatives, we must now pass to some birds that climb. First comes the cuckoo, which we all love for its beautiful musical "coo-coo," yet despise for its cruel habits. For every European cuckoo that grows up, four or five murders are committed.

The cuckoo reaches England about the end of April or the beginning of May,

THE BEAUTIES OF THE GOOSE FAMILY

These beautiful flamingoes really belong to the goose family, though the shape of the beak, the long legs, and the colour of the rosy white plumage make the flamingo very unlike a goose. In India the flamingoes assemble in tens of thousands, and, as they fly or wade or swim, look like clouds at sunset or floating islands all rosy in hue.

This curlew utters a piercing cry when disturbed in its marshy home. It eats insects, worms, and shellfish.

The stilted plover gets its name from its long, stilt-like legs. Several species are hunted by sportsmen.

Avocets are nearly related to stilted plovers, and resemble them in habits. They have curious curved beaks.

Whimbrels are much like the curlews, and, like them, leave marsh and moor for the coast where their winter food is.

Men require knives to open oysters, but this oyster-catcher bird opens them with its beak and eats them.

The ruff grows a big fringe of feathers round its neck during the love-making season. The female is called a reeve.

The picture of the crowned cranes on page 1957 is by Sir Harry Johnston, and the photographs are by W. P. Dando, Lewis Medland, Oliver Pike, R. B. Lodge, Underwood & Underwood, and Gambier Bolton, by permission of the Autotype Co.

and sings until the middle of June. It leaves for Africa again in August or September. In that time it must have its numerous brood reared. It is a big bird, almost as big as a sparrow-hawk, and other birds, notably the sparrows, regard it as a sparrow-hawk which has not the courage of one. They therefore persecute the cuckoo.

Now, if this sort of thing went on all through the summer, the cuckoo would never be able to collect food enough for its babies. This may be its excuse for its bad habit of laying its eggs in other birds' nests. The female lays an egg, then takes it in her mouth and flies to the nest of a hedge-sparrow, a water wagtail, a titlark, a yellow-hammer, a green linnet, a shrike, or a whin-chat. While these are away, the mother cuckoo quietly pops its eggs into the nest and disappears. Sometimes she may knock out or even break some of the other eggs, but this is not the regular practice.

THE CUCKOO

The little birds come back and hatch all the eggs, that of the cuckoo included, while the mother cuckoo lays six or seven more, and places each one in a different nest. Now, when the young cuckoo is hatched, it feels the other little birds in the nest. As it grows stronger, it is necessary for it to have more room and more food than the others. It would die if they remained in the nest. So, though it is a blind, naked thing, it commits murder. It gets the other little birds on its back, then, struggling up the side of the nest, it throws them over to die. Then it has the nest to itself. The mother bird does not notice the deception, or, if she does, probably she thinks it is an accident. She devotes all her time to feeding the young bird which has murdered her own children; and the cuckoo grows up big and hearty, and flies away to another country, to come back and itself place its eggs in other birds' nests. It is one of the most wonderful things in bird life. The baby cuckoo for the first fortnight has a deep curve in its back, so that it can the more surely raise the other little birds to the top of the nest and kill them. When it has done its wicked work, the young cuckoo loses this curve, and grows into a splendidly handsome bird.

There are many species of cuckoos which do not practise this trick, but hatch their own eggs. It is believed, however, that the American cuckoos are gradually taking to the same thing. One of its companions in evil is the American cowbird, the bird which eats the insects from the hides of cattle. This one lays its eggs in other birds' nests. The young do not throw the others out, but kill them by crushing them with their greater weight, or by snatching all the food which the parent birds bring to the nest.

Among the climbers the name of the woodpecker must occur to all our minds. It possesses a beak as remarkable as that of the darter, but, instead of a spear, the woodpecker's is an axe, with which it cuts its way into the trunks of trees. It climbs along the trunk and branches of trees, and is able to tell in an instant, by the tapping of its beak, if there are insects inside. Boring insects do great damage to trees; and the woodpecker is the only bird that can dig them out. It makes a hole with its sharp beak, then thrusts in its tongue and catches all that may be inside. If we had a few cuckoos and woodpeckers among our trees, they would keep the leaves free from caterpillars and the trees free from insect pests. The woodpecker bores his home in the trunk of the tree, and it is said that he does the same thing with telegraph poles, causing them to rot away. It is hard to say whether he is a blessing or a nuisance, but at any rate we have very few woodpeckers in this country.

THE WOODPECKER

The next stories of Birds begin on 2051.

The first drawing shows hair enormously magnified. The others show how the nail grows on the finger, the last one, much magnified, showing the finger as if it were cut across and through the nail.

THE HAIR AND THE NAILS

CONTINUED FROM 1912

In many parts of the body are special cells in the skin, with power of making certain outgrowths of skin which we all know very well. Our skin does not produce so many of these as does the skin of many animals, but at any rate it produces two kinds of outgrowth—hair and nails. Our nails are very interesting, for they correspond to the claws of a cat or a tiger, and also to the hoofs of a horse. A horse's hoof is really the nail of the middle finger or the middle toe; it has lost the other fingers and toes, or rather its ancestors lost them for it.

For many creatures, these outgrowths of the skin at the ends of their fingers and toes are extremely important. Perhaps they catch their prey by them, or else they walk upon them, or else they can climb by them. But in us these things have lost their importance, just as so many other parts of our bodies have lost their importance, because we have intelligence, by means of which we are able to do things for which animals require to use claws and teeth, and so on. Still, our nails remain, though they are too weak and thin to be of much use, but at least they have a very interesting history. They grow from below, and can be completely removed without destroying the cells which make them. If you play cricket, or even if you do not, you may have had a nail banged. If it is banged hard, it turns blue. That means that a blood-vessel has been injured, and there has been some bleeding under the nail. In course of time the nail gets loose, and comes off, and then a new nail gradually forms underneath it. But if damage had been done to the special cells which have the power of making the nail, then no new nail could ever form again.

Perhaps you have noticed that sometimes the nails show white lines across them, or perhaps even little grooves. After an illness, these marks may appear on all our nails, and at just about the same height in each case. They mean that during the illness the blood was not quite well, and so the cells that make the nails did not do their work quite properly, and therefore these little flaws appear. Gradually they pass up to the tip of the nail, as it is pushed onwards, until at last they disappear. Anyone who notices this could guess that you had had an illness. I think this is one of the ways in which clever people sometimes pretend that they can tell you all about yourself by looking at your hands.

Hair is the other thing which our skin produces. The part of the hair that shows above the skin is really made of very much the same kind of material as the epidermis, or outer skin, which is also very much the same as the material that the nails

are made of. The hair has various uses. In a creature like the cat, it serves for warmth. Our own hair is so slight in quantity, except upon the head, that it has no use for this purpose. Indeed, our hair, like our nails, is mainly a sort of relic, reminding us of our likeness to the whole animal kingdom.

Almost the whole of the skin is covered with fine hairs, but there are none on the palms or soles, and I do not think you will ever find anyone who has a single hair growing on the last joint of any of his fingers. The most useful hair that we have in our bodies is certainly that which makes our eyebrows and eyelashes. We read on page 779 of the use of our eyebrows, and eyelashes have the same use, mainly to protect the eyes from dust, and also, I think, to make the eye look nice. Little hairs inside the nose are also useful to catch dust. No one is quite sure why hair grows on men's faces. It is of no use.

THE WONDERFUL WAY IN WHICH OUR HAIR IS MADE AND LOOKED AFTER

If we look at the fine hair on the arms, we notice that it runs in different directions in different parts. It has been noticed that these directions are the best for a creature sitting huddled up in the rain, for they would help the rain to run off the limbs. The hairs on the arms run to the elbow, and the hairs on the legs run away from the knee. But as we never sit in the wet, huddled up with no clothes on, this does not matter much to us. Still, it is interesting, just as it is interesting to remember that the valves in our veins are arranged as if we were meant to walk on our hands and feet.

Each hair grows from a special little place in the true skin. If the true skin is destroyed, a scar forms, and we may feel all right again; but nothing can ever form true skin again. A scar is not skin. There are never any hairs to be found growing from a scar, and when the rest of the body is dripping with sweat, a scar will be perfectly dry, for it never has any sweat-glands in it. The special little places from which the hairs grow are very complicated and beautifully made. Every hair really consists of six layers, all of which are made by the cells of the little hair-bulb from which the hair grows. But each hair requires to be looked after, or it will become brittle, and will break off. So there are special glands—usually two to each hair—which produce a kind of oil that keeps the hair soft and pliable, and prevents it from cracking. Also, every hair has a muscle which is attached to its root, and when this tiny little muscle contracts, it pulls upon the hair and makes it stand upright. So when we read stories of people whose hair stood on end, it is quite possible that that really might happen, though it is not common.

HOW THE CAT MAKES ITS HAIR STAND ON END TO FRIGHTEN ITS ENEMIES

We scarcely ever use these little muscles, and no one can use them by his own will. Like the hairs themselves, they are relics from the past. A cat has them, and everyone who keeps a cat has seen its hair stand on end. A possible use of this is that it may help to clean the skin. But there is a more likely explanation still. When an animal like a cat makes all its hair stand on end, the cat looks much bigger and more alarming than when its hair lies flat. It is probable that this is of use to animals in helping them to frighten their enemies.

The hair of the head varies very much in different races of men. In most of us it is fairly straight and long; but the hair of a negro is quite different. It is very short and woolly, and if it is cut across and looked at under the microscope, we see that it has a different shape. These differences of shape serve to distinguish one race of men from another race much better than do differences of hair-colour.

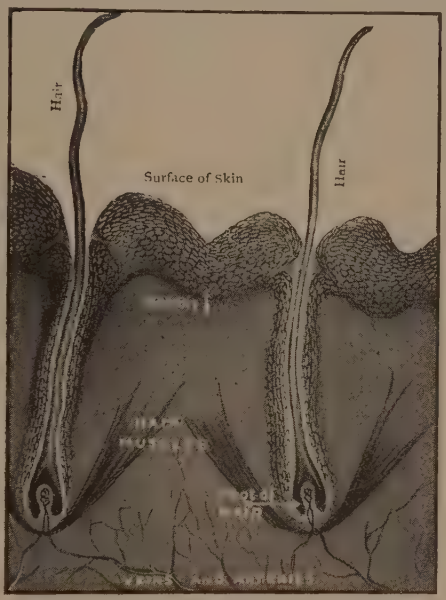
THE TEETH ARE SIMPLY OUTGROWTHS FROM THE SKIN

We shall not discuss the teeth here, though their turn will come, but it is interesting to know that they are really outgrowths of the skin, just as nails and hair are. The history of teeth begins with the fishes, and in them we can quite clearly see that the teeth are just a special row of skin projections that form round the edge of the mouth. In the development of each one of us the teeth are really formed from a sort of inturning of the skin that lines the mouth. All animals above the fishes have this development, with the exception of the birds. We know that the

earliest birds had teeth, but no kind of bird alive to-day has teeth, although they have beaks instead. These also are really outgrowths from the skin.

In some of the lower animals the skin is a very important organ for breathing. It is so thin that the interchange of gases between the blood and the air, which goes on in our lungs, can actually go on through the surface, or almost the whole surface, of the body. This, for instance, is the case with the frog. We can scarcely breathe by our skin, however, though there seems to be just a little interchange of gases through the openings of the sweat-glands.

Though the skin is waterproof — so long as the outer skin, or epidermis, is uninjured—yet things dissolved in fat or oil can be rubbed into the skin through the openings of the sweat-glands. Various medicines can be taken in this way. Often children take cod-liver oil so, when it would upset their stomachs if they swallowed it. A poor, thin baby can be wonderfully fattened in this fashion. Another way of getting things through the skin is by the use of electricity, by means of which many drugs can be made to pass through it. Any part of the skin can be made very sensitive to cold, so that, if it is exposed to cold, the whole body may be disturbed in such a way as to make us ill. The way to do this is simply to cover the skin up. The thinnest and most delicate part of the whole skin is the skin of the face, but as we do not cover that up, we do not "catch cold," as the saying goes, by exposing it. As a rule, the skin of the hands is exposed, and so we do not catch cold when our hands become cold. Now, the skin of the feet, or, at any rate, the soles of the feet, is very thick and hard—the greatest contrast in the whole body to the skin of the face. But in this part of the world people always cover up their feet, and that is the way to make the skin sensitive to cold. The consequence is that if our feet get wet we very often "catch cold."



This shows the roots of the hairs on our skin, greatly magnified. It is the tightening of the muscles of the hair, near the root, that makes the hair "stand on end."

That is simply because the feet have been covered up, as was pointed out by a great English writer on education, John Locke, more than 200 years ago. In some cities you may see children running about or standing in the cold and wet with bare feet; yet they come to no harm. This shows that as long as the skin is allowed to do its work for itself in a natural way we do not fall ill when the skin is chilled. It is only when we cover the skin up and keep it warm — whether it wishes to be warm or not—that it loses the power of looking after itself. This is true of every part and every duty of the body. If a healthy man goes on crutches, his legs become weak. If a man's food is digested for him outside the body, his stomach loses the power of digestion for itself. If we take medicine every night to make us sleep, we soon become unable to sleep without medicine. If other people always do your thinking for you, you will become unable to think. If you protect your skin against cold, it becomes unable to protect itself. If you have short sight and use strong eyeglasses, your sight becomes shorter still.

This is a great, simple rule to which there are no exceptions, and yet we all forget it at times, though it is the greatest of all rules for the health of the body. We have our food prepared so that we do not need to use our teeth—some people even have the crust of toast cut off—and then we wonder why our teeth decay. Our elevators take us upstairs, and then we wonder why we get out of breath when they are not working and we have to walk. It

is true of every part of the body, as it is true of the body as a whole, that *effort is the law of life*. There is a fine saying of one of the greatest men who ever lived, the Italian artist Leonardo da Vinci: "Thou, O God, hast given all good things to man at the price of labour." This applies to everything, even to the people who cannot stand sun or cold or fresh air because they coddle themselves up too much. They have taught their skin not to labour for itself, and have made it weak and helpless.

THE WONDERFUL LITTLE STRUCTURES THAT GIVE US THE SENSE OF TOUCH

But there still remain some most important facts about the skin of which we have said nothing. It is one of the great organs of sense or feeling. We are rather apt to confuse the various kinds of sensation that our skin gives us, as if they were all varieties of the same thing, but they are not. There is, first of all, the pressure sense, or sense of touch. This is quite different from the sense of pain, or of temperature.

If we examine the true skin—and especially if we examine it in the tips of the fingers and toes—we find special little structures in it which are there for the purpose of touch. Nerves run to them, and the ends of the nerves spread out within them. Wherever these little touch-bodies, as they are called, are most numerous, there our sense of touch is most delicate, and that is why so many of them are found in the tips of the fingers, where it is necessary that we should feel very delicately. Many of them are also found in the skin of the lips, and they also occur in the tip of the tongue. Two points can be felt as two by the skin of a forefinger, when they are very close together, but if the distance between them is increased by twenty times, we can only feel them as one when they are applied to the skin of the back. The skin of the forehead and of the palm of the hand will feel the lightest weight, while the skin of the chin requires the weight to be twenty times as heavy before it can be felt.

THE NERVES THAT GIVE US THE FEELING OF HEAT AND COLD

The sense of heat and cold is quite distinct from the sense of touch, and has a quite special set of nerves for itself. If you take a cold thing, like the tip of a lead pencil, and pass it over your cheek, you will find that it feels colder at some spots than at others, and the same is true of anything hot. The skin seems to be made up of a host of little spots—pressure spots that are sensitive to pressure or touch, cold spots that are sensitive to cold, and do not feel heat at all, and hot spots that are sensitive to heat, and do not feel cold at all.

Finally, there is the pain sense. Different parts of the body are very differently sensitive to pain, and the skin is far more sensitive in general than the inside of the body. The pain sense has a special set of nerves of its own, and in some people, who have something the matter with these nerves so that the nerves cannot act, the skin of the hand will appreciate heat and cold and touch, but pins can be run into it, or it can be pinched, without any feeling of pain at all.

HOW THE SKIN PROBABLY HELPS US TO KNOW THE POSITION OF OUR BODY

So we must think of the skin as the organ for three senses—pressure, temperature, and pain—and not as the organ merely of one sense. People often say that we have five senses, but, as a matter of fact, we have far more, and three must be put down to the credit of the skin alone. It is also probable that we are helped to know the position of our body—where our hands and feet are, and so on—by the amount of stretching of the skin in one part, or loosening of it in another part, which helps the brain to know where the different parts of the body are. So, in addition to everything else that it does, the skin contributes to our sense of position—one of the senses without which it would be very hard to live, but which few people have heard anything about.

On page 1134 a little has been said about the ridges on the fingers, which are very interesting. The lines in the palm of the hand are simply creases in the skin where it is folded upon itself. They have no other meaning, and it is very foolish to believe the people who pretend to tell the future by looking at these creases. More can be told about a man from the creases in his trousers than from the creases in the palm of his hand.

The next part of this is on page 2097.

WHERE THE NUTS COME FROM

CONTINUED FROM 1751

ALTHOUGH Eastern America has two species of hazel nuts, the nuts of one kind being wrapped in quaintly-fringed round husks, and those of the other enclosed in husks that are extended into long tubes with fringed mouths, the shrubs are seldom cultivated, and never to the extent that they are in Europe. Cobnuts or cobs, they are called in England; or, when oblong in shape, they are known as filberts. We often see both kinds in our shops.

The hazel opens its flowers long before the broad leaves expand; the male flowers are those little catkins which children call lambs' tails; the female flower is the most modest little bloom, and we can never find it unless we look right at the tip of the bud.

Although the tree is small, it is valuable apart from its nuts. The thin twigs make baskets; thicker ones make hoops and stakes; while the bigger timber, when burnt, makes the best charcoal, which artists value when it is made up for them into crayons. The nuts themselves give splendid oil, which is used in painting pictures, and also in making costly scents. The tree itself, as well as the nuts, gives valuable oil, some of which is said to cure toothache.

Many of the edible nuts that come pattering to the earth in Autumn, fall from great and picturesque trees belonging to the walnut tribe. We may find in the woods of various parts of the country, as well as in the markets, the pecan (grown for its fruit in the southern states), the butternut, a host of hickory nuts, and the black walnut, which has been perhaps more generally planted than any other. But nearly every farm has its shagbark hickory, left to grow and scatter its thin-shelled, sweet nuts for the farmer. It can always be recognised by the long strips of bark hanging like loose shingles from their upper edges. The walnut of Europe is common in our shops, with its thin shell, and easily-extracted meat. When young, the nuts resemble green, hard young pears. These when plucked before the shell has formed inside, are put into vinegar and converted into pickles.

In the Old World, the walnut is an important form of food for poor people. Enough walnuts are grown there to supply quantities to manufacturers, who press out the rich oil which the nut contains. Then they sell the nut, squeezed into cakes, with the oil gone, to poor people for food, or to the farmers, who give it to their cattle.

The wood of the walnut tree is among the most valuable of all woods. From it we make beautiful pianos and cabinets and the stocks of our guns. The

bark and the green covering of the nut give a rich dark dye, with which wood of lighter colour is stained. The leaves, when bruised, yield a pleasant balsam. The walnut tree reaches a height of nearly a hundred feet, and such a tree, sold for timber, is worth $3000.

One of the hardest nuts to crack, yet one of the nicest to eat, is the Brazil nut, which is grown in Brazil and other parts of tropical South America, and in French Guiana. It is a surprising growth. With such a hard shell, one would think that it does not need much protection. But the nuts grow in clusters, twenty or more packed together inside a great hard shell. The Brazil nut is the seed of the tree, and this hard shell encloses it, as the fruit of the peach encloses the hard stone. The outer shell in which the Brazil nut grows is the colour of a cocoa-nut, and quite round. When the nut is ripe it falls to the ground. The tree grows to a height of over one hundred feet, so, as we may imagine, it is dangerous to walk under these trees when the nuts begin to fall.

Ground nuts, or peanuts are better known to British children as monkey nuts. They grow in Asia, Africa, and America, and contain a good deal of oil, which is used chiefly for making soap.

The most valuable of all nuts is the cocoa-nut. It grew first of all along the East Indian coast and the South Sea Islands, but it seemed as if Nature had given it almost animal powers. The nuts, when ripe, fall from the tree and into the sea, and go sailing off on the tide to distant lands. If there is enough soil for it, and the climate is warm, the nut takes root in the soil and grows into a tree, and scatters its nuts on the ground or into the sea. Some will root there and form more trees; others will sail away to grow in other lands. In this way shipwrecked men find food and drink and lodging in uninhabited islands. It is a life-saver in the wilds.

The cocoa-nut grows on a palm tree, which has a stem about 18 inches round, and from 60 to 90 feet high. At the end of seven years the new tree begins to bear fruit, and it goes on bearing fruit for the next seventy or eighty years. The hard shell of the nut is enclosed in a tough shell of fibre, from which the cocoa-nut matting is made. This double protection keeps out from the nut evil insects, like those which bore through the shell of our hazel.

The milk in the cocoa-nut is simply the juice of the palm tree's fruit. Other fruits, which are soft, have their juice distributed all through their system, but as the cocoa-nut grows, the kernel becomes hard and shrinks, and the milk, or juice, collects in the centre.

Each big cocoa-nut tree gives from 80 to 200 nuts in the course of a year. The dried leaves of the tree, which are from 10 to 15 inches long, make thatch for the roofs of the huts; the small leaves and fibres make screens, mats, baskets, and so forth.

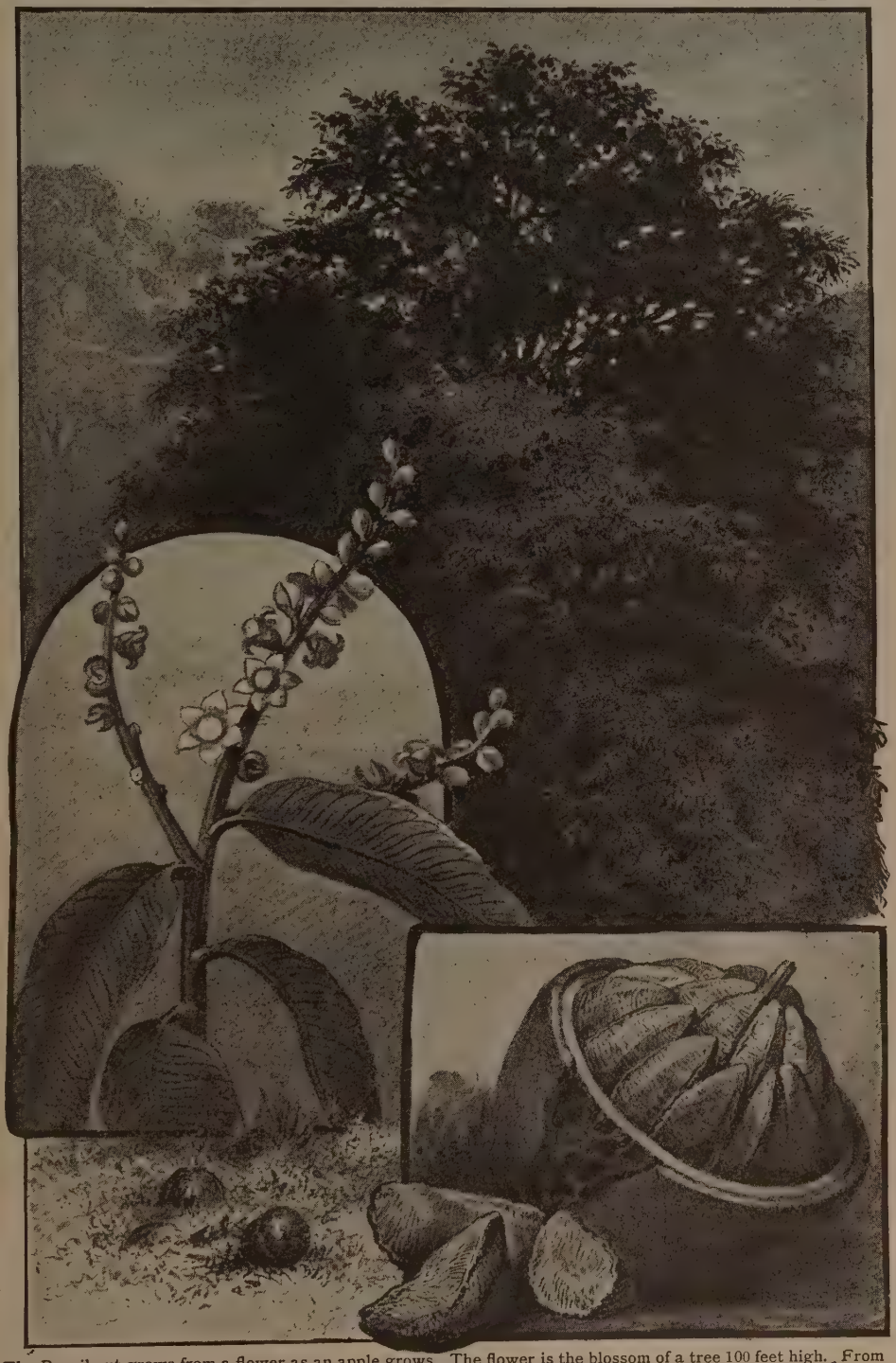
There is a big trade in cocoa-nuts, for they yield a valuable oil, which can be used in lamps, or for ointment, or even as medicine. It is valuable, too, for making soap which can be used at sea. Ordinary soap will not lather in salt water, but soap made from cocoa-nut oil will. Seven or eight cocoa-nuts give a quart of oil. The shell of the cocoa-nut can be carved and polished.

The large chestnuts which are often used for a sugary confection and are sold, raw or roasted, in our cities, come from the south of Europe. They grow in spiny husks, three nuts to a husk, like the common horse-chestnut, upon a fine handsome tree. Poor people in Europe roast the chestnut, or boil it like potatoes, and grind it for flour, to make into bread. Our own chestnuts are smaller, especially the chinquapins, but quite as sweet. Chestnut wood is easily split, has a handsome grain, and is used for railroad-ties, the interior of houses, furniture and the like.

The sweet almonds that we eat have been brought into existence by the care of men. At one time all almonds were bitter and poisonous. They grew first in Africa, but trees have been taken to Italy and other warm countries.

The almond is a relative of the peach tree, but, instead of enclosing its nut in fruit, it grows a husk, which shrivels and opens as the nut becomes ripe. The bitter almond gives excellent oil, and its wood is valuable to cabinet-makers.

THE NUTS OF WHICH MEN ARE AFRAID



The Brazil nut grows from a flower as an apple grows. The flower is the blossom of a tree 100 feet high. From that flower, such as we see here, a shell forms, and within it about fourteen nuts, each nut in its own shell. The outer covering of the nuts is as hard as rock, and when the nuts are ripe the great shells fall down like cannon-balls. Natives will not go near the tree when a wind blows, lest the falling nuts should kill them.

THE COCOA-NUT THAT PLANTS ITSELF

This cocoa-nut palm tree has grown from one cocoa-nut. It is from 60 to 90 feet in height, and for 70 years or more will give scores of nuts every year. Every part of the tree is valuable for some purpose or other.

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These cocoa-nut trees, growing on a desert island, may have sprung from nuts which have been washed ashore from other islands after having been tossed about for many weeks in the sea.

Copyright by Underwood & Underwood, N. Y.

The nuts, when ripe in their husks, fall to the ground or are pulled off by natives and stripped of their covering ready for sale.

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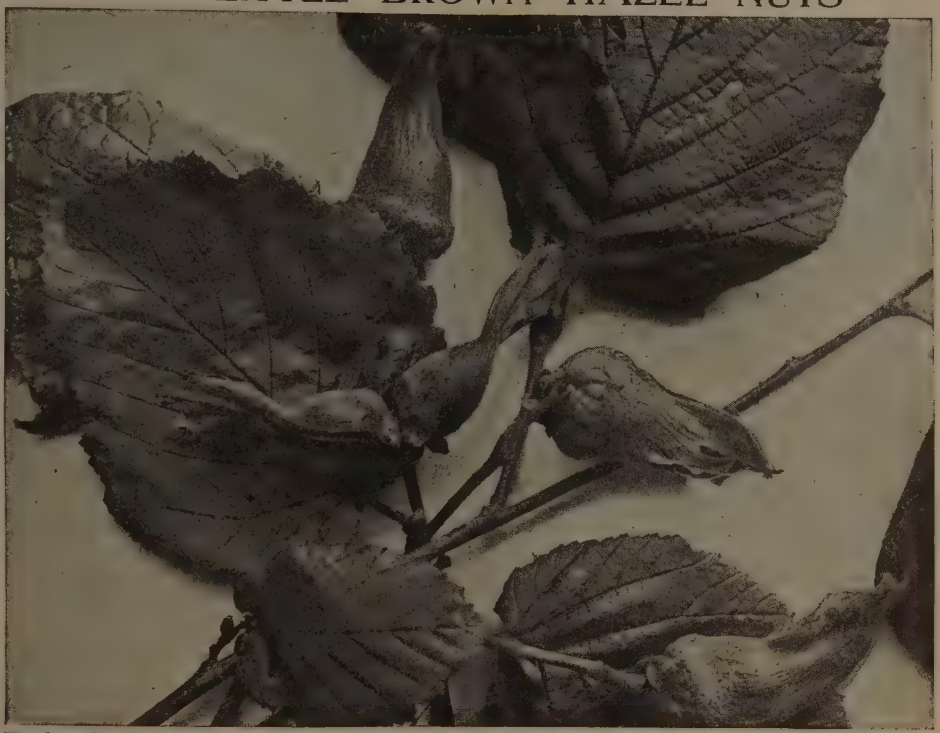
THE LITTLE BROWN HAZEL NUTS



The finest hazel nuts in the world are grown in England, and the best of them are grown in Kent. There are two sorts, and these are the filberts. Maidstone is the centre of the hazel-nut country. Many more ought to be grown.

The Kent cob, shown here, is round instead of almond-shaped. The little brown nuts sold without husks are Spanish hazel nuts from Barcelona. Hazel nuts have an insect enemy which bores right through their shells.

THE TWO SORTS OF CHESTNUTS

Although we like chestnuts, they do not form an important article of food in this country, but in Europe, poor people boil them as we boil potatoes and grind them for flour. The chestnut tree is valuable for timber.

The horse-chestnut, which every boy knows, cannot be eaten. It is rank and poisonous. But we have thousands of the trees, because they grow quickly. They have splendid foliage, and their blooms are magnificent.

THE WALNUT IN ITS GREEN POD

These are not apples, but walnuts, growing inside their green pods. When young the pods, with the unformed nuts inside, are made into pickles. The walnut tree is famous for its wood, which makes the finest pianos and furniture Walnuts are important as food in Europe; here they are nothing more than dessert.

The photographs on these pages are by Underwood & Underwood, London, Keystone View Company, H. Irving, J. E. Tyler, J. Valentine, and C. C. Pierce.

THE ALMOND FROM FLOWER TO NUT

Here we trace the almond from flower to nut. First comes the beautiful blossom. This falls away and a shell appears. This swells and hardens, and then we have the full-sized shell containing the nut.

This picture shows the sweet almond tree as it grows in southern California, where large quantities of nuts are produced. The tree presents a fine appearance when in bloom, as the pale pink flowers are very beautiful.

This almond grove is a triumph for skilful man. Once all almonds were bitter and poisonous, but by years of care and experiment men changed the nature of the nut and gave us the sweet almond which we now enjoy.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 2101

HOP-O'-MY-THUMB

CONTINUED FROM 1908

A WOODCUTTER and his wife, who lived on the borders of a huge forest, had seven children. They were all boys, and the youngest of them was so tiny that his father called him Hop-o'-my-Thumb.

Once the woodcutter and his family had been well off, but the time came when things got so bad that the poor man began to wonder if he would always be able to find enough food for them to eat.

Now, although Hop-o'-my-Thumb was the youngest of them all, he was very shrewd and wide-awake, and he knew quite well what it was that made his father and mother so anxious.

One evening, as he lay awake in his little bed, he heard them talking in the parlour below.

"I cannot bear to see my children starve," his father was saying. "To-morrow I shall take them out into the forest and leave them. Perhaps some-one may find them and feed and care for them."

But the mother burst into tears.

"How can you be so cruel?" she sobbed. "If they are to die, better that they die here, where no greater harm can befall them."

But the father would not listen. He, too, loved his children dearly, but he could not bear to see them die before his eyes. And so the plans for the morrow were made.

Hop-o'-my-Thumb was very wide awake indeed by this time, and before he went to sleep he, too, had made his plans. Early in the morning, before even the birds were awake, he ran down to the brook, and filled his pockets with little white pebbles. Then he crept back to the house, took off his clothes, and jumped into bed again.

After breakfast their father told them they were to spend the day in the wood. The boys were delighted, and hurried off with shouts of laughter. But Hop-o'-my-Thumb managed to get behind the rest, and as he walked he carefully dropped his little pebbles all along the path.

Soon they came to a part of the forest where the trees grew thickly together. Here their father stopped, and set to work to cut down a tree. The little boys were told to tie up the faggots, and then, when they were too busy to miss him, the father stole quietly away. But it was not long before he was missed, and when they found themselves alone in the dense forest the boys were afraid.

But Hop-o'-my-Thumb smiled to himself.

"Have no fear," he said boldly. "Follow me, and I will lead you home."

Within a yard of where they stood was the last pebble that he had dropped; beyond it lay another—and another, and so, following the stones, Hop-o'-my-Thumb led his brothers safely home.

While all this was happening, their mother sat at home, thinking sorrow-fully that she had seen her boys for

the last time. Presently there was a knock at the door, and in came a forester to say that his master, who had heard of their distress, had sent them a present of some venison. But before the poor woman could answer she heard shouts, the door burst open again, and in ran the seven little boys.

"Here we are, mother!" they cried. "We lost ourselves in the forest, but Hop-o'-my-Thumb brought us home without taking one wrong turning."

Their mother was overjoyed to see them again, and when their father came home in the evening, after having wandered about all day, too miserable to face his wife, a happier family than theirs was not to be found.

But the venison did not last for ever, and the day came when no food was left in the house but a loaf of bread. Hop-o'-my-Thumb knew this, and guessed what would happen. Sure enough that same evening he heard the woodcutter tell his wife that once more he must take the children into the forest, in the hope that somebody rich and generous might find them and give them a home.

At daybreak Hop-o'-my-Thumb sprang out of bed, and ran down the stairs, only to find, to his bitter disappointment, the door firmly barred and bolted. In despair, he turned and made his way slowly back to bed. But at breakfast an idea came to him. Instead of eating his slice of bread, he hid it in his coat, so that he might use the crumbs as he had used the pebbles to mark out the path.

Soon the father called the boys, and bade them go with him into the wood. Again, as before, he set them to a task, and then slipped away unnoticed.

The boys were not alarmed this time. "Hop-o'my-Thumb knows the way," they said. But when Hop-o'-my-Thumb came to look for the crumbs that he had carefully strewn, there were none to be found! The birds had eaten them.

"Now we're in a pretty pickle," thought Hop-o'-my-Thumb. "Come, boys," he said aloud, "we can't stay here. It will soon be dark, and the wolves will be out."

They found a path and set out bravely. Soon the sun went down, and the shadows began to fall. Presently one of the brothers ran on a little way ahead.

"I see a light," he shouted suddenly. "Look! There is a house. Let us beg a bed for the night."

They ran and knocked at the door. A woman with a kindly face opened it. But when she heard what they wanted she shook her head.

"Alas," said she, "my husband is an ogre. He will be returning soon, and if he finds you he will kill you and eat you."

The boys trembled.

"We dare not go out again into the dark forest," they said, weeping.

"Come in, you poor boys," said the woman, taking pity on them. "I will do my best for you till the morning."

She hid them away in a garret and left them. Presently the ogre came home. He made such a dreadful noise coming up the steps that one of the brothers peeped out of the window to see what was the matter. The ogre glanced up with a look so terrible that the little boy drew back in terror—but not before he had been seen.

Up the stairs into the room strode the ogre. But it was dark, and he could see nothing. He struck a match, lit a lamp, and held it up. In the corner, all huddled together, he saw seven frightened little boys with white faces. One by one he pulled them out and looked them up and down.

"They will make a fine supper when they are fattened up a little," he said to his wife. "Give them a good meal and put them to bed. See that they have plenty to eat for a week, and by that time they ought to be fit to eat."

When the boys had had an excellent supper, they were taken into a room with two enormous beds. In one of these slept seven little ogresses, with seven gold crowns on their heads. Into the other crept the seven brothers. In the middle of the night the ogre woke up and began to feel sorry that he had not killed the boys on the spot. He got out of bed.

"What are you looking for?" asked his wife.

"My dagger," answered the ogre. "I'll make sure of those boys. Boys are slippery customers—they may escape."

Now, Hop-o'-my-Thumb, who had not closed his eyes all night, heard this.

As quick as lightning he jumped up, snatched up the golden crowns, and put them on his brothers' heads; then he carefully put the boys' nightcaps on the ogresses' heads and scrambled back into bed, just as the ogre came in. He went up to the bed where the seven little brothers lay, felt the golden crowns, and passed over to the other bed. Here he found seven little heads inside seven little nightcaps.

"Ah!" he said. And with one sweep of his dagger he slew them all.

Immediately he had gone, Hop-o'-my-Thumb woke up his brothers, and

HOP-O'-MY-THUMB GUIDED HIS BROTHERS SAFELY THROUGH THE WOOD

out they all crept, just as the dawn was breaking. But before they could get very far away the ogre discovered what had happened.

"Bring me my seven-league boots!" he bellowed to his wife. With these boots he could go at a terrific speed. The boys saw him coming, and gave up all for lost. And, indeed, the ogre had nearly reached them, when his foot slipped, and he fell—right on to the huge dagger that he carried in his hand. The dagger ran into his heart, and with a groan he rolled over, dead.

Hop-o'-my-Thumb ran up to him, dragged off the seven-league boots, and put them on. Leaving his brothers in the care of some woodcutters who were passing, and who promised to take them home, he made his way in fifty strides to the palace. In the palace gardens Hop-o'-my-Thumb was fortunate enough to find the king, surrounded by a group of courtiers, deep in conversation. Hop-o'-my-Thumb hid himself behind some trees and waited his opportunity. The discussion was a serious one. It appeared that the king was in despair that he could not get a message to his generals, who were fighting a great army miles away, in time to be of service. Unless this message could be delivered without delay it would be useless, and the enemy would conquer. Suddenly, to everyone's amazement, Hop-o'-my-Thumb stepped out from his hiding-place, showed the king his magic boots, and offered to carry the message faster than the swiftest horse. The courtiers were furious at his boldness, and would have thrust him out of the palace garden, but the king, who had taken a fancy to Hop-o'-my-Thumb, silenced them with a gesture, and gave his consent. Hop-o'-my-Thumb went, delivered his message, and returned in triumph.

From that day Hop-o'-my-Thumb's fortune was made, and he and his father and mother and his little brothers lived happily together ever after.

GERAINT AND ENID
A Tale of King Arthur's Court

ONE morning in early summer, Queen Guinevere, with a lady at her side, sat on her horse and waited on a hill to watch King Arthur's hunting of a deer.

While they stood there, Prince Geraint—a comely and vigorous young man—rode up the hill and drew rein at their side. He was too late for the hunt, so he stayed with the queen, and watched the vast woods in the distance and listened for the braying of the hounds.

Presently there passed by the hill, on the winding road in the valley, a strange company of three—a knight, a lady, and a dwarf, who lagged behind. They were all mounted, and rode slowly, the noise of their horses' hoofs on the soft earth scarce rising to the hilltop. The queen, puzzled to know the name of the knight, sent her lady after the dwarf to inquire.

But when the lady returned she had a red weal across her face, and indignantly she told how the arrogant dwarf had first refused to tell his master's name, and then, when the lady would have ridden past him, had cut her across the face with his whip. At this Geraint clapped spurs to his horse, and pursued after the dwarf. But he, too, fared in the same manner. In his first rage, Geraint laid hand to his sword, meaning to cut down the dwarf, but his noble nature rebelled against striking so mean a creature. Therefore he rode back to the queen, obtained her permission to ride after the knight who kept so unmannerly a follower, and then, armed only with a sword, set off to demand an apology for the insult.

He saw the three riders far ahead of him disappear over the crown of a hill, and, following, discovered a little town in the valley below, into which they had disappeared. When the young prince arrived in this town, no one would give him lodging or lend him arms, or, indeed, take notice of him. The smithies rang with the sound of the hammering, there was a hurrying to and fro, and he learned that a great tourney was to be held on the morrow.

At last, however, an old earl, who lived in an almost ruined castle, received the young prince, and the daughter of this earl, Enid by name, took Geraint's horse to the stable and waited upon him as he sat at meat. And Geraint loved her. She was fair, and the clouded, simple dress she wore could not obscure the dignity and nobility of her soul. Much amazed to find this earl and the beautiful Enid living so shabbily, Geraint told why he had come to the town, and the old earl, in return, told his story.

The knight whose dwarf had insulted him was called Sparrow-Hawk. He was a cruel and wicked man. He loved Enid, and because the earl would not give his beautiful daughter to so turbulent and bad a man, this Sparrow-Hawk had lied against the earl, had raised the town against him, and had even broken into his house and spoiled it of its once fair possessions. He had now built a castle in the town, and usurped all the privileges of the poor old earl.

Then Geraint craved leave to fight for Enid in the tourney, and the earl gave him leave, and Enid, who loved his noble face and quiet voice, was glad and happy. They found armour for him, and made it ready for the great tourney, and he rode into the lists and overthrew all who came against him. And when Sparrow-Hawk bit the dust before him, Geraint gave the bad knight his life on condition that he rode to Arthur's court and craved pardon of the queen for the insult done to her.

And now for Enid came the happy days of preparing for her marriage. She would have worn a glorious dress worthy of King Arthur's court, but Geraint, who loved her, with a man's delight in pure simplicity, begged her to wear the simple gown in which first he had seen her; and, thus dressed, she went with him to Caerleon.

They were most happy on that ride, and full of play, like children; and when she said, "What will the queen think of my ragged dress?" the young prince kissed her fears away, and with brave words made her less afraid of entering King Arthur's court. And all loved Enid when she came among them, and the queen clothed her for the marriage in dresses royal and magnificent, and Geraint was proud of his little, beautiful, dear wife, who had grown to womanhood in poverty and simplicity.

AS THEY STOOD ON THE HILL, A KNIGHT, A LADY, AND A DWARF PASSED IN THE VALLEY

But soon after their marriage came those evil days when men said that Queen Guinevere loved Lancelot more than the king, and the air of the court seemed full of whispering and slander. The noble Prince Geraint, brooding on these tales, hated to see his young, fair wife laughing among the other ladies at the court, and determined to take her away. So long did he brood about the matter that he began at last to wonder if she loved him best; it seemed to him in his melancholy mood that her eyes shone as brightly for others as for himself, and that she was as pleased to talk with the other knights as with her own husband. Thus did the noble heart of Prince Geraint become first suspicious, and afterwards bitter as gall. So he got permission of King Arthur to go to his own land, and there he dwelt with Enid, and gave himself up to loving her. But Enid, sorrowing that her brave lord had retired from his brave life, blamed herself, and one night, in her sleep, she cried aloud, "Oh, me, I fear that I

GERAINT AND ENID, RIDING THROUGH THE WILDS, CAME UPON A LADY WEEPING

am no true wife!" Geraint heard her, and his soul staggered within him. He believed her false.

On the morrow he said roughly to her, "Put on your worst and meanest dress," and bade her get to horse, and ride on ahead of him; and, whatever might happen, she was not to speak to him. So Enid did his bidding, and wore the dress that he had first loved her in, whereat his heart grew sad. And thus they rode into the wilds.

And towards sunset Enid saw three tall knights waiting in ambush for her lord, and she rode back and told him.

Geraint rebuked her for breaking silence, and went forward. He overthrew the knights, stripped them of their armour, which he laid upon their horses, and then, knotting the reins of the horses together, bade Enid drive them before her.

Shortly afterwards Enid came upon a lady weeping over a knight who lay dead on the ground. She returned and told Geraint, and he rode up and said, "Lady, what has befallen you?"

"Noble knight," she replied, "as we rode through the forest three villains set upon my husband and slew him."

So Geraint rode on and overthrew the three false knights.

Then they came to a town and fell in with the great earl of all that territory, who had loved Enid years before. And this earl entreated her to leave Geraint, who treated her so pitifully, and to become his own proud wife, and dwell happily with wealth and honour. Enid, seeing that he would murder Geraint, promised and bade him come for her at dawn; but before the dawn she roused Geraint, told him the story, and they rode away. The earl and his followers pursued. Geraint slew the terrible earl, and put his followers to flight.

But as they rode away Geraint suddenly swooned in his saddle and fell. Enid came back to him, and found him bleeding from an almost mortal wound. While she tended him, wailing because she thought him dead, the bandit Earl Doorm, with a great company, came charging by. The earl bade two of his men carry Geraint to his castle, and rode forward again. All day Geraint lay upon his shield in the castle of Doorm, his sword at his side, like a man dead. And at night a great feast was made in his castle.

It chanced that Earl Doorm, looking up from his eating and drinking, saw Enid sitting in shadow by the deathlike knight, and called her to his side.

"Eat!" he commanded.

"Not till my lord arises," said Enid.

"Drink!" cried Doorm.

"Not till my lord arises!" said Enid.

Then Doorm swore a great oath, and bade her think no more of a dead man. He offered to make her his wife, sent for gorgeous raiment, and told her she should rule over his land. But Enid shook her head, and replied she loved one only. Doorm laughed scornfully, and pointed at her sorry dress, as though to say, "How well he loves you!" And Enid answered that in that very dress her lord had first looked upon her and loved her. Wroth to the full, the turbulent earl strode towards her and struck her a buffet on the cheek. But at that moment Geraint sprang, sword in hand, from the shield, and with one stroke "shore through the swarthy neck" of Doorm. At sight of the head rolling on the floor, and at sight of Geraint, risen, as it seemed, from the dead, the people fled terror-stricken from the hall, and they were left alone in a great silence.

Then Geraint looked upon Enid, and she came towards him open-armed. Very softly he craved forgiveness of his wife. He had heard her words to Earl Doorm. He knew her now for his true wife. All suspicion was swept from before his eyes. He saw her in all her gentle sweetness and truth. Nevermore would he think ill of her; nevermore would he doubt her. She could only answer with her arm and her lips.

At that same moment they became aware of a sudden stir without, and, expecting danger, went forth, to find King Arthur and his knights before the castle. The king had come to punish the wicked bandit earl, and Geraint found himself once more, happy and glad, among his friends. And Enid lived to be known by all people as Enid the Fair and Enid the Good, and Geraint loved her to the end of their days.

THE DOG AND THE WOLF

A LEAN, half-starved wolf happened one night to meet a dog who was well fed and looked happy. The wolf said:

"How well you are looking! I really never saw anyone looking so well. How is it that you are so well fed? I run into danger much more than you do, and yet I am almost starving."

"Why, you may live just as well as I do if you will do the same work."

"Indeed, what is that?" asked the wolf.

"Only to guard the house at night, and drive away thieves," answered the dog.

"That will just suit me," replied the wolf, "I shall be only too glad to exchange my rough life for plenty of food and a good roof over my head."

Then the wolf saw a mark round the dog's neck, and asked what it meant.

"Oh, that's nothing," said the dog. "But if you must know, my master ties me up in the daytime for fear that I should bite people, and I am only let loose at night."

"Thank you," replied the wolf. "You may keep your happiness to yourself. I would rather be free than be well fed under such conditions."

It is better to be poor and free than to be rich and a slave, says Æsop, the author of this fable.

THE LITTLE PRINCES IN THE TOWER

TOWARDS the end of the fifteenth century, a little cavalcade set out from Ludlow Castle for London; and the centre of this party was a handsome boy thirteen years of age. News of his father's death had reached the castle, and, as his father was Edward IV., King of England, the little boy set out as soon as possible, with the gentlemen about him, to claim his kingdom.

On the way the party was met by Richard, Duke of Gloucester, a small, misshapen man, with cunning, cruel eyes and a harsh tongue. This Duke of Gloucester was the younger brother of the dead king, and uncle of the handsome boy riding to claim his kingdom. He explained that he was Regent of England, because the new king was only a boy, and, accusing the gentlemen who rode with little Edward V. of treason, he had them arrested, and himself took charge of the boy-king.

The boy cried bitterly when his friends were taken from him, for he feared his ugly uncle, and hated to go with him to London. But the Duke of Gloucester pretended to be a kind uncle, and told the little king not to fear. He had him carried to the beautiful Tower of London, where the boy was to lodge until the affairs of his kingdom were settled. But when the door of the Tower closed upon him, the poor little boy-king knew that he was a prisoner.

The queen, when she heard what the Duke of Gloucester had done, fled in terror with her second son, whose name was Richard, to Westminster Abbey. She felt sure that some evil would befall her elder son, and determined to save her second son from the wickedness of the ugly uncle.

Now, this brutal man, Richard Duke of Gloucester, had the black heart of a murderer. The young princes, Edward in the Tower of London and Richard with his mother in Westminster Abbey, were not pretty boys in his eyes, but only hateful obstacles to his great ambition.

He wanted to be not Regent, but King of England. Between him and that ambition were the warm young bodies and the fresh young lives of these two pretty children. To slay those fair bodies and send those two innocent souls into eternity became the master passion of this black-hearted man.

How did he accomplish this end?

He first sent a kind bishop to the queen in Westminster Abbey, saying that the little king in the Tower longed for his brother to play with him, and begged her that the boy might be sent thither. Most reluctantly the poor queen gave up her second son; and the two little brothers clasped each other in the Tower of London, and wondered what would become of them. They were both very frightened, very lonely, and very sorrowful.

Then the Duke of Gloucester spread the wicked lie that these young princes were not the sons of the dead king. He hoped that the people would cry out "Long live King Richard!" but there was no shout for this evil man. He cut off the heads of all those true noblemen who stood by the queen, and gathered about him a weak party who declared that he was the rightful king. People were actually paid to go about saying that the Duke of Gloucester should be king.

At last, in defiance of the whole nation, the duke was crowned King of England, while the true boy-king remained a prisoner in the Tower. If the nation had risen, as it should have risen, and had cried that Edward the Fifth was their king, Richard would have been saved one of the foulest deeds in history. He could not rest. He was the king. He was Richard III. He wore the crown. His word was absolute. His power none could dispute. But the little boys still lived.

He was troubled by the thought of those two poor, miserable children, shut up in the Tower, and frightened by their own shadows. They poisoned his happiness, and kept him jealous and afraid. While they lived he was a robber. He determined to be a murderer.

One day he could bear the thought no longer. He sent to the governor of the Tower, telling him that the princes were to be killed. The governor refused to execute this abominable command.

Then the king sent another messenger, bidding the governor deliver up the keys of the Tower for one night. This the governor was obliged to do.

TWO BOYS WHO WERE BORN TO BE KINGS

Terrified and lonely, yet closely guarded in the Tower of London, wandered these two little boys over 400 years ago. One is Edward V., the rightful King of England, and the other is his younger brother, Richard, who would have followed him on the throne if he had lived. But their wicked uncle, the Duke of Gloucester, imprisoned them, and afterwards had them secretly murdered in order that he might become King Richard III.

That night two murderers approached the Tower, and opened the doors with the keys got by the king. They made a hole in the stone floor under the staircase, and then, sweating from their labour, ascended the stairs. They reached the door of the room where the young princes slept. They stood for a moment to gain their breath. Then, very quietly, they turned the key in the lock, and stole into the room on tiptoe. The only sound was the breathing of the sleepers.

The two beautiful prisoners lay in each other's arms on the big bed. Their curls lay spread upon the pillows. Their cheeks were flushed by troubled dreams. Their eyelashes were wet with tears. They had fallen asleep cuddled close together in that companionship of fear which possessed them every day, and still more in the dark hours of the night. Nothing could have been lovelier or more holy than the sight of those two sleeping children.

The murderers looked for a moment at the sleeping princes—one of them the rightful King of England—and then turned hastily away lest the beautiful sight of that pure and innocent sleep should rob even their hearts of energy for this foul deed. Then they laid sudden hold upon the bed-clothes and the pillows, wrenched them off, and crammed them over the heads of the startled and awakening children.

As the poor children roused, the murderers pressed the weight of their bodies on the suffocating load, and forced the pillows hard against the mouths of the boys. A little cry; a convulsive struggle of the two poor little bodies; then a long and feeble twitching of the limbs—and the murderers felt, under the clothes, the bodies of their victims lie still for ever. The prisoners were set free. The hard-breathing murderers drew away the clothes, and saw that the princes were dead. They gathered in their arms the dead bodies, still warm with departed life, and carried them out of the room and down the stairs.

In the hole which they had dug they threw the bodies, and covered them with broken stones and earth, and trod the place flat. Then they went out of the Tower, and passed into the night, with the stars above their heads, and the Thames making music in their ears.

Richard the Third was king.

WHEN THE BLIND LED THE BLIND

How did the blind learn to read? A French writer M. Dufall, has told the story.

A man named Valentine Haüy, who for a long time had thought how he could bring happiness to these unfortunate people, was one day walking through an out-of-the-way boulevard, when he came upon a blind beggar.

Touched by the helpless sorrow of the man, he put his hand in his pocket and gave him a piece of money. But he had hardly taken a step forward when the beggar, an honest man, called him back.

"Surely, sir," he said, "you have made a mistake; you have given me a franc instead of a sou. '

The astonished giver asked the beggar how he had been able so quickly to detect the different value of the money.

"Oh," said the beggar, "it is enough for me to pass my finger over it."

This was like a flash of light.

"If the blind," thought Haüy, as he continued his walk, "can distinguish at the least touch a piece of money, why should they not distinguish by the same means a letter, a figure, a mark—in short, any sign whatever so long as it is raised?"

On this foundation he set to work, and presently invented a method for teaching the blind to read. His first pupil was a blind boy whom he rescued from begging at a church door. This boy learned with astonishing quickness to read by means of raised letters. Very soon Valentine Haüy was able to show his pupil in public, and the sight of a child reading with his fingers excited the greatest surprise and admiration.

When his method was perfected, he appealed to the public for funds to carry on his work, and, thanks to the subscriptions which came to him from all sides, Haüy was soon able to open the first institute for teaching the blind to read.

LEGENDS OF PLACES IN ENGLAND

THE CROCK OF GOLD IN THE PLAIN OF YORK

UPSALL CASTLE now lies in ruins on the Hambleton Hills overlooking the great plain of York. Some time ago a man who was living near the castle had a strange dream, three nights running, that if he went on foot to London Bridge and stood there waiting he would have some good news. So he took a wallet and a stick, and walked to London, and stood waiting on London Bridge until he was tired out. Just as he was going away a Quaker came up and asked him why he stood there.

"Because of something I dreamed," said the Yorkshireman.

"Oh, I don't believe in dreams!" said the Quaker. "Why, only last night I dreamed that there was a crock of gold buried under the elder-tree in the corner of Upsall Castle!" The Yorkshireman hurried back to Upsall, and began to dig under the elder-tree. There he found a pot full of copper coins. On the pot was written:

Look lower! Where this stood
Is another twice as good.

He dug lower, and discovered a chest full of silver, and on it was written:

Look lower! Where this stood
Is another twice as good.

So he still dug on, and found the gold.

THE FAIRY HORN NEAR GLOUCESTER

ONE hot summer day an outlandish knight set out from Gloucester, and lost his way in the great forest. He grew very weary and hungry, and, meeting a woodcutter, he asked him where he could get meat and drink. The woodcutter led him to a green mound, and said:

"If you will ascend this mound, and cry 'I thirst!' the fairy cup-bearer will appear." The knight did as he was told, and a cup-bearer, clad in a rich crimson dress, sprang out of the mound, bearing a large horn cup, set with gold and jewels, full of fairy wine. When the knight drank the nectar, all his thirst and weariness left him. The cup-bearer courteously waited for him to return the fairy horn. But the knight rudely rode away with it.

As soon as the Earl of Gloucester heard of this he pursued the knight, and slew him. The cup, presented by the earl to the King of England, was lost.

THE ENCHANTED CAVE OF RICHMOND HILL

MANY legends are told of the brave deeds of King Arthur and his knights, but in Yorkshire there is the legend of an enchanted cave beneath Richmond Castle, where the king and his knights are laid to rest. It has been seen but once—by a potter named Peter Thompson, who was one day wandering round the hill of Richmond Castle. He entered a ravine, at the end of which stood a huge boulder. Climbing over it, he saw a glimmer of light, and reached a lofty cavern glittering with crystal, spar, and stalactite. On a rocky couch lay King Arthur, clad in armour, with a jewelled crown upon his head, and a diamond-hilted sword beside him. Around him lay his knights asleep.

Peter Thompson drew the sword half out of its scabbard, but the sleeper showed signs of awaking, and he rushed in terror from the cave. As he went, a hollow cry came from within:

Potter, Potter Thompson,
If thou hadst either drawn the sword or blown the horn,
Thou'dst been the luckiest man that ever yet was born.

Terrified, he ran home. Many times he tried to find the cave again, but failed; but they say the king and his knights still sleep beneath the Castle Hill.

THE PARSON AND HIS CLERK AT DAWLISH

A PARSON and his clerk were riding one stormy night toward the pretty village of Dawlish, on the Devon coast, and lost their way. It was the clerk's fault, and the parson said to him, "I'd rather have the Evil One for guide!"

A strange horseman at once appeared and offered to direct the lost travellers. Just before reaching Dawlish they passed a brilliantly-lighted mansion. The strange horseman invited them to enter, and provided them with a splendid breakfast. But when the parson and his clerk came out of the mansion and tried to ride away, their horses would not budge. "The Evil One take the brutes!" said the parson.

"I will," replied the horseman, lashing the horses over the cliff into the sea, where their riders changed into two rocks, now called the Parson and his Clerk.

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THE RHINE ON ITS WAY TO THE SEA

Water gives us some of the most beautiful pictures in the world. This striking scene is simply a photograph of one of the mightiest rivers in Western Europe, the Rhine, in Germany. A photograph taken from the same spot one second later or one second earlier would be entirely different, so rugged are the rocks over which the river rushes on its way down from the highlands into the lovely valley that it has carved for itself on its way to the sea. To sail along the Rhine is one of the greatest pleasures a traveller can have, so fertile and beautiful has this mighty river made the country through which it passes. (This photograph is by Ballance)

WHY DO WE COUNT IN TENS?

CONTINUED FROM 1868

You may well ask why we count in tens, for it would be much more convenient if we counted in twelves—if we had a *duodecimal* system of counting in twelves instead of a *decimal* system of counting in tens. I mean that we should invent two extra single figures for ten and eleven, and then write ten to mean twelve, and eleven to mean thirteen, 100 to mean 144 (twelve times twelve instead of ten times ten), and so on.

I believe we shall all do this some day; and the reason is that, while ten can only be evenly divided by two figures, two and five, twelve can be evenly divided by four figures. Thus, for many purposes it would be better to count in twelves, and, indeed, we often do so, as when we count twelve inches in a foot and twelve eggs in a dozen. This would also fit in nicely with the number of months in the year. But we count in tens still, as a rule, and we shall doubtless do so for many a long day yet, simply because our ancestors have always done so.

If you think how you sometimes used to reckon when you started arithmetic, you will guess the simple reason why. It is because we have ten fingers. When we count on our fingers, as children do, and as the first men did, it is natural to make a fresh start after ten, because then we go back again to the finger we began with. So all over the world, and in all times and places, we find men counting by tens—using a decimal system, as we say—just because men and women everywhere have ten fingers.

WHY HAVE WE TEN FINGERS?

Nature decided on five fingers, or toes, at the end of each limb very long ago indeed—ages before man appeared upon the earth at all. It is true that, at first sight, there seem to be many exceptions to this. We find only one obvious finger, or toe, for each limb in the horse, two for the pig, and so on. But the original figure was five. The hen, for instance, has only three and a half toes, and when we examine the skeleton of its wing—which is really its arm—we find three and a half fingers there. The chicken, as we see it, is the same. But if we examine the hen's egg before the chicken is ready to break through the shell, we find that it has five fingers, or toes, on the end of each of its four limbs; only the birds have apparently found that they could do as well with three and part of a fourth, so they have stopped developing the rest. We must go far

below the mammals or the birds, or even the reptiles, for the beginnings of the five-fingered or five-toed arrangement, and it is not till we study the still humbler creatures that we get to the real beginning. If we look at a frog we can see that it has five fingers and five toes, just as we have. So we may say that it was the frog, or the remote ancestors of the frog, which decided ages ago that we should count in tens!

WHY ARE ALL OUR FINGERS NOT THE SAME LENGTH?

It might be very difficult to answer this question if we had only the present use of the hand to account for; and it is a disadvantage to us that our little fingers and ring-fingers, for instance, are so short and weak, for this weakens our grasp of things, which is the principal purpose for which we use our hands. Also, this inequality of the fingers in length and strength is a difficulty for the pianist and the typist. We therefore cannot hope to answer this question by referring to the usefulness of the hand for its present purpose. But we find the answer when we consider the history of the hand, and when we look at the fingers of many kinds of lower animals which have fingers more or less like ours.

We are told that hands were originally used for standing and for walking, and that they are like the fore feet of animals. If we put the hand on a table, as if we meant to walk on the tips of the fingers, I think we shall see at once what a well-balanced support it makes, just because the fingers are unequal in length—the middle finger the longest, and the short thumb and little finger falling behind and balancing the whole. We see the same thing at the zoological garden in the case of animals that have three fingers—as the toes of the forefeet might rightly be called—and we can notice it for ourselves any day in the dog or the cat. This is only one instance of a very large number furnished by our bodies which help us to understand why certain things, for which we can find no particular reason now, and which may even be inconvenient to us, are as they are.

WHY HAVE WE FINGER-NAILS AND TOE-NAILS?

Perhaps we may think that, at any rate, there is a use for finger-nails, as we can use them to scratch with when an insect has bitten us. But we do ourselves no good by scratching; and at the present day there is no explanation of finger-nails and toe-nails so far as use is concerned. If we turn to the past, however, we find the explanation at once. Our nails are in our own bodies like the things which the lower animals have and make great use of as claws and hoofs. We live by our minds, not by things like claws; and as we have not sufficient use for them, they have grown smaller and weaker in us—just as our teeth also have done, and our bones and muscles in large degree—until we have nothing left but nails.

Yet there is no doubt that they are really similar to the claws the cat uses for fighting and for climbing with, and for tearing its food; and the hoofs which the horse uses for walking upon. The ancestors of the horse had five fingers and toes, as we have, and a nail, or hoof, at the end of each; but all these except the middle ones have shrunk in the modern horse, until in him we find only one that reaches the ground, and the remains of another on each side. Occasionally we find a young horse born with three or even four toes. The horse's hoofs, then, are really the nails of its middle fingers and middle toes, and are very useful to it. They are made of the same material as our nails, and can be cut without pain, as our nails can.

WHY DOES A MOTH FLY ROUND AND ROUND A CANDLE?

No one can say what it is in the brain—or beginnings of a brain—of the moth that decides it to like the light; and it is quite clear to everyone that this liking does the moth no good—at any rate, in the case of such a light as the candle. It may possibly be that it benefits the moth, and other creatures that behave like it, to fly towards light from darkness; and perhaps we should find this to be so if we knew enough of the lives of these creatures. But much study has lately shown that animals and plants can be divided into those which go naturally from darkness to light, and those which go naturally from light to darkness. Learned names have been applied to these habits—names which mean that the creature turns sunwards or away from the sun. Different plants and different parts of the same plant behave in similar ways; and if we notice the behaviour of a

baby towards a bright light we shall see that it is really like the moth. We find also that different creatures tend to move towards or away from other things besides light—such as heat, gravitation, electricity, and all sorts of chemicals and smells. Some grown-up people are like the moth—they move to the sunny side of the street; and others are like insects that usually live in darkness and fly towards it—they move to the shady side of the street.

WHY ARE SOME PEOPLE DARK AND SOME FAIR?

The differences of colour between various people are a good instance of those many differences which are due not to anything that happens to us in the course of our lives, but to something that is inborn in us, and usually derived from our parents. The children of two dark parents are dark, those of parents who are both brown-eyed are always brown-eyed, and so on. This way in which people resemble their parents is one of the most important things in the world, and the special name for it is *heredity*. We say that the thing in question, such as skin-colour or eye-colour, is *hereditary*.

All human beings may be divided into races by their colour—the fair-skinned, the yellow-skinned, and the dark-skinned; and they are all apt to think the others ugly when the differences are accompanied by others. In the United States there is a great mixture of races, though the majority belong to the dark-skinned family of mankind. Among us are a fairer and a darker race, and it is known that at present, owing to some reason we do not understand, the darker people are increasing and the fairer people becoming fewer. It is probable that, ages ago, differences in colour depended partly on the amount of sun, darker people having colouring matter in skin and eyes which protects them from strong sunlight; but this is a question about which we do not know much yet.

WHY IS THE SKY DULL WHEN A STORM IS COMING ON?

The light of day is almost all due to the sun. The stars are shining, of course, as they do all the time, but they are so far away that the light of all of them put together counts for nothing compared with the sun; nor does the light of the moon count for anything when it happens to be up during the day. Thus we may say that the light of day is due to direct sunlight and to skylight, which is sunlight reflected from the sky—that is to say, from the air. When a storm is coming on, clouds gather, and these clouds are thick and dense, so that they cut off the light of the sky, and so we say that the sky is dull. If we went up in a balloon above the clouds, we should find ourselves in brilliant sunshine, even when it was almost as dark as night to the people on the earth below.

WHERE DOES THE SPRING-WATER COME FROM?

Spring-water comes from the sky. If we live in the country, we soon find that the springs are dependent upon the rain, and when there is little rain, or none at all, the springs shrink, or may even dry up completely. This is true, even though the spring-water is seen coming from the earth. It is rain-water that has soaked into the earth, and then found its way to the surface again at the spring. And the spring-water runs at last into a lake or a river, and so to the sea, from which the sun sucks it up again, to send it down as rain. This goes on ceaselessly; and so the water of the spring has been round and round, in spring, sea, sky, and earth, countless thousands of times before we were born, and will be doing so hundreds of years after we are dead.

Spring-water is very good to drink, for it is very pure, it contains a lot of air dissolved in it which gives it a pleasant taste and sparkle, and it has dissolved into itself from the earth through which it has passed a number of different salts that are very good for us.

WHERE DO PLANTS GET THEIR SALTS FROM?

The salts of plants are necessary for their own lives, and are very valuable for us when we eat the plants, or when we eat other animals which eat the plants. There are very few salts in rain-water; but the rain-water, when it becomes what is called soil-water, melts, or dissolves, into itself everything that can be melted from the earth around it. Exactly what these salts are must depend, of course, upon the particular kind of soil, and this is very

important, for some plants require some salts and some require others; so the quality of the soil in various places decides what kinds of plants can or cannot grow there. The plant gets all its water and all its salts by its roots; and it can get no salts in the solid state, but only those that are dissolved in the soil-water. If we want certain plants to grow — such as grass or wheat, or even trees — we may often supply salts to the soil, so that they may be dissolved by the soil-water, and taken into the body of the plant.

WHY DOES WOOD ROT AWAY?

Well, there are kinds of wood that will not rot away, even though they are kept in water. The ancient city of Venice is actually built on wooden piles buried in the shallow sea; and these have lasted for many centuries already. This wood does not rot because the things that make wood rot cannot attack it, and wood does not rot without a cause.

We shall begin to guess what it is that makes wood rot when we learn what is done to wood that must be exposed to wet and yet must not rot—for instance, the wood of which railway sleepers are made. These are often soaked with a chemical substance called *creosote*; and the particular property of creosote which makes it so valuable is that it is poisonous to microbes. So the answer to the question, in one word, is *microbes;* and wood will not rot if it is charged with something that kills microbes, or if it is made of stuff so hard and tough that even microbes cannot digest it; or if, as in the case of Venice, it is very good wood, and also protected from the kinds of microbes that can rot wood by being kept in salt water.

WHY WON'T A THIRD TOOTH GROW?

When we are born we have, hidden in our gums, all our first, or *primary*, teeth. These twenty teeth are already completely formed in all their parts at birth, and only have to get through the gums in order to be seen. A baby gets its food by sucking and not by biting, and so it is really better that its teeth should be out of the way at first, below the gums. Still deeper in the gums, below each of the primary teeth, and also farther back in the jaw than the primary teeth extend, there are little groups of cells, called tooth-germs, which will some day make the second set of teeth, usually called the *permanent* teeth, though they are often not as permanent as they might be. There are thirty-two sets of these little cells: and though none of them are teeth, or look in the least like teeth, they have in them the power of making teeth of the various kinds that we possess.

We should take very great care of the first teeth of children, brushing them, and having them filled if they decay, even though we know that they will fall out soon, because if they are neglected the tooth-germs underneath them are very apt to be injured, and when the new teeth come they will be irregular, or have thin, soft, crumbly outsides, which easily break away or decay. Now we see why a second tooth grows when the first falls out or is pulled out. But no third tooth will grow when a second tooth has been lost, because there is no other tooth-germ lying below the second tooth, as there is below the first tooth. Thus a third tooth cannot grow because there is nothing for it to grow from.

IF WE THROW UP A BALL & GO FORWARD WHY DOES THE BALL FALL AT OUR FEET?

Of course, it all depends how we throw the ball. The question really means that we throw the ball straight upwards; and yet, as we move forward, the ball does so too, so as to fall at our feet. This does not happen if we are standing still. If the ball has been truly thrown it returns as it fell; and if we move forward as soon as it leaves the hand the ball will fall behind us.

But what you have noticed, I think, is that if we throw a ball straight upwards *as we run* it falls into our hands, even though we have gone on running. The answer is that the ball has shared the motion of our body. Though we have directed it straight upwards, yet it is moving forwards as well, since it was doing so when it started, *because we were.* Similarly, a ball shares the motion of the earth, and, if thrown up from a point that seems to be not moving, falls back to it; though the point has really moved many miles before the ball returns, the ball has moved with the earth and the air, and falls back to the same spot, though ball, earth, and air have moved far from where they were at first. All this teaches us that

the motion we notice is always *relative* to something else—that is to say, we compare it with something else that does not move, or that we cannot see move. If the something else moves too, we notice nothing. You may notice this any time you are in a train. If you pass a train that is standing still, you notice that you are going quickly; but if another train is going side by side with yours at the same speed you appear to be standing still.

WHY DO ONIONS MAKE OUR EYES WATER?

Our eyes are really watering all the time—that is to say, we are producing tears that pass over the eyeball and keep it clean. That is why we wink—to carry the tears that appear under the upper lid over the surface of the eye. These tears escape into the nose, as we know. We say that our eyes water when the tears form so quickly that they cannot escape quickly enough, because then we see them water. Onions give off something to the air which excites the ends of the nerves of smell in the nose, and also excites the ends of the nerves of touch in the eyeball and eyelids, and so sends a message to the brain, telling the tear-glands to make tears quickly, and then we say that our eyes water. There is use in this, as there usually is in such things, for the rapid flow of tears helps to protect the eyelids and the eyeball from the stuff the onions give off. In people who, for some reason, cannot produce tears, such things as onions will make the eyes smart severely, because such people cannot protect themselves by making their eyes water.

HOW DOES THE MILK GET INTO COCOA-NUTS?

The stuff that we call the milk of cocoa-nuts is not milk, and has nothing about it at all like milk, except its appearance. It would be a puzzle, indeed, if real milk were found in cocoa-nuts, for milk is formed only by the milk-glands of certain animals, called mammals. If you tried to feed a baby on the milk of cocoa-nuts instead of real milk, you would very soon learn the great difference there may be between things that look the same. Only it would be a very wrong thing to do, for the baby would very soon die. Various plants besides the cocoa-nut produce fluids that look milky, and are often called milk, simply because they look like it; but no plant produces anything at all the same as real milk. The milk of the cocoa-nut is simply a fluid formed by the tissue, or substance, of the nut, and so we need not ask how it gets there.

WHY ARE WE TAUGHT AT SCHOOL TO USE OUR RIGHT HAND AND NOT OUR LEFT?

Babies are born with a natural tendency to use one hand more than the other. In the greater number of cases this is the right hand; but in a few — perhaps about six in a hundred — it is the left. It is not worth while to train both hands equally for everything — for instance, for writing — as this would take too much time; and we could not become so clever with either hand if we were taught to use both equally for everything. Therefore it is quite right that, at school, naturally right-handed children should have most attention paid to the right hand; but it is a pity that we should not find out which of the children are naturally left-handed, and train the left hand especially in them.

The reason why people are naturally right- and left-handed depends on the brain. The left side of our brain controls the right side of our bodies, and the right side of the brain controls the left side of our bodies. Thus right-handed people are really left-brained, and left-handed people are really right-brained. If they knew it, they speak and write and read with the left side of their brains, while left-handed people do so with the right side of their brains. People have one side of the brain rather bigger than the other: right-handed people the left side of the brain, and left-handed people the right side. This seems to depend on the amount of blood the two sides of the brain get; and in most of us the left side gets rather more, and so it takes the lead.

WHY DOES A RIVER CURVE AND TWIST INSTEAD OF RUNNING STRAIGHT?

The course of a river-bed entirely depends on the lie of the land. If this changes in course of time, the course of the river will change. The water runs downwards to the sea, pulled by the earth's attraction as near as it can get to the centre of the earth. It must run just as a ball would run on an irregular surface. Thus, sometimes, where the earth falls evenly, like a tilted table, a river will run quite straight; but if

A FAMOUS PICTURE MADE IN MARBLE

This famous picture of St. Mark is made of marble. It is what we call a mosaic, one of the most wonderful triumphs of the artists. The secret of mosaic is the putting together of thousands of tiny pieces of marble or glass of many colours so as to make pictures or patterns. Some of the noblest pictures in the world are in mosaic; there is a picture in St. Peter's at Rome which took ten men nine years to make in this way. The inside of St. Mark's at Venice, where this picture is, is nearly all mosaic, and contains some of the finest pictures in the world, made in marble of natural colours without any paint. There is a mosaic factory at Rome where men copy great pictures for churches, and the coloured glass they use is said to have 28,000 different shades.

A CHAPEL IN A MILLION PIECES

This beautiful little chapel shows us one of the most wonderful ways of decorating a building that has ever been invented. It is what we call "mosaic," a thing made up of little pieces. The chapel is made of marble from floor to ceiling, and the patterns and pictures that we see everywhere are not painted, but are part of the floor and walls and ceiling, which are built by putting together thousands and thousands—there must be over a million—of little pieces of marble and glass. In the cleft in the wall lies one of the Popes. They buried him first in St. Peter's, but he wanted to lie among the poor, and so they built this little chapel, one of the most beautiful little chapels in the whole world, in the poor streets of Rome.

there is a little hillock in the way the river will run round it.

When we notice the ordinary curves and twists in the course of a river, we may see no good reason for them, for all the land may look equally flat. But that is only because we cannot, with our unaided eyes, see accurately enough. If we use a special instrument to show us "how the land lies" at any point, we shall find that the river is really doing the only thing it can—running downwards all the time.

WHY DO THE BEDS OF RIVERS CHANGE?

The earth's crust is shrinking all the time, as the interior cools and shrinks beneath it. This means that the lie of the land changes from age to age, and one consequence of this—it has many and great consequences—is that often the water of a river finds that its steepest and quickest course to the sea is different from what it used to be, and so the river-bed changes; the old one is deserted by the waters, and a new one is formed.

But the water itself, as it flows, rubs and melts away the earth it flows over, and so grinds a deeper and ever deeper bed for itself. Thus it gets less and less likely to desert its old bed the longer it flows there. In many parts of the world we can see how water has hewn a path for itself, even through solid rock. The railway engineer wishes to avoid carrying his trains uphill, just as the river water wishes to avoid travelling uphill; and so the engineer often bores a tunnel, rather than make the trains run out of their course. Sometimes the river does the very same thing. A train cannot cut a tunnel for itself, but sometimes water can, and then we have a river running underground.

WHAT IS A VACUUM?

Vacuum is simply a Latin adjective meaning *empty*, and we have an English word, *vacuous*, which has the same meaning, and which we sometimes apply to the expression of a person's face when it seems to mean nothing—to be *empty* of meaning. In the study of Nature we often talk about a vacuum, meaning by that an empty space. It is always necessary to remember that there is really no such thing as empty space, for what we call the *ether* is everywhere.

But when we speak of a vacuum we are leaving the ether out of account, and are simply thinking of gases, such as the air. We take such a thing as a globe of glass, which cannot collapse when the air is sucked out of it—a paper bag would not do, for when we suck the air out of that the air-pressure outside it makes it collapse—and we attach a pump to it, so as to suck out of it all the air we can. When we have done so, we call the space inside the glass globe a vacuum. As a matter of fact, we can never get a real vacuum, but only a space which contains comparatively little air. Even if we have a perfect pump that cannot leak—and I am sure I do not know where to find such a pump—and even if we work it for a thousand years, each time sucking out some of the air that was in the globe, we shall *never* have a perfect vacuum; only what is called a very *high* vacuum.

WHY CANNOT WE MAKE A REAL VACUUM?

Now, you would think that, if only we went on long enough, we are bound to get a vacuum, but that is not so. Let us even suppose that, being lucky enough to have a very fine pump, every time we work it we suck out one half of the gas that is in the globe. After the first stroke we have got rid of half the air; after the second we have got rid of three-quarters; after the third, of seven-eighths; after the fourth, of fifteen-sixteenths. This looks like doing what we want very soon; but if you go on reckoning for yourself you will find that something is always left, and always must be left. At each stroke you get out less than at the last, and after each stroke there is still left half of what there was before it.

Trying to make a vacuum in this way is the same as if a man asked for a sum of money, say, 64 cents., and agrees to draw 32 cents. at once, then 16 cents., then 8 cents., and so on. Each time he gets half of whatever remains to be paid. Very soon he has 63 cents., but not in a million years will he ever get the full of that last cent.

No one has ever made, or ever will make, a perfect vacuum. There are other ways of trying to do so besides this way with an air-pump, but none of them are perfect, though they may be better than the air-pump way.

WHY IS IT EASIER TO SWIM IN SALT WATER THAN IN FRESH?

Swimming has two parts, really—one is to keep up in the water, and the other is to move along in it. The question really is: Why is it easier to keep up, or to float, in salt water than in fresh? The answer depends wholly on the heaviness of our bodies as compared with the heaviness of the water. Our bodies are more than three-fourths water, but most of the rest is heavier than water. The fat of our bodies is lighter than water, and so helps us to float.

Now, fresh water is less heavy than salt water, and so our bodies, though only a little heavier than it, tend to sink in it. Ordinary sea water is heavier than fresh water, because it contains a lot of salts melted in it, just as the water of our own bodies does; so we find it easier to float and swim in sea water. But in some parts of the world there is water that is much salter than even sea water; this is the case, for instance, in the Dead Sea, and we have all heard of the Great Salt Lake in Utah. There is so much salt in the water of the Dead Sea that it is actually heavier, on the whole, than our bodies are, so you cannot sink in the Dead Sea! On the other hand, there are some liquids much lighter than water, and if a man were to fall into a lake of one of them he could not swim at all, however good a swimmer he was; his body would sink like a stone in such a light liquid.

WHY HAVE WE TO DEVELOP PHOTOGRAPHS IN A RED LIGHT?

We know that white light is really a mixture of light of all sorts of colours—red, yellow, green, blue, and so on. Some of these lights of various colours have one kind of power, and some another. For instance, red light has far more heating power than violet light, which has practically none at all, while red light will soon show its power on a thermometer. Now, the kind of light that has the power of causing chemical changes, which is the light we see specially by and the light we photograph by, is mainly violet light, or the violet part of white light. We can see, in a way, by red light; but red light has practically no influence on photographic plates. We may say that photographic plates cannot see red light, and so we can use red light to develop them by, without fearing that the photograph of our faces or the walls of the room will be printed on the plates.

WHEN WATER GOES BAD, WHY DO COLOURS COME OVER ITS SURFACE?

What happens when water "goes bad" is that various forms of life grow on its surface. Pure water alone will not support life; there must be some other things in the water, and perhaps a fatty or oily layer on the surface of it, before these things—mainly microbes—will grow. Their growth covers the surface of the water with very thin layers of matter from which the light is reflected to our eyes when we look at it. But it happens, as in many other cases, such as a soap-bubble or mother-of-pearl, that the light is partly broken up as it is reflected from these thin layers of stuff, or as it passes through them if we were to see the water from below; and so the colours are produced. The reason is that the waves of light, as they return, some from one layer of the surface, some from another, interfere with each other, and the proper name for this is the *interference of light.*

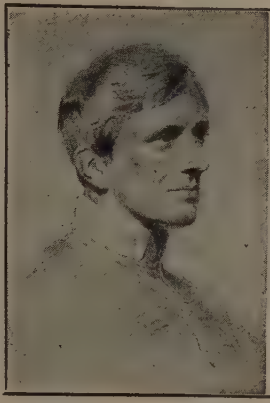
WHAT IS BEAUTY?

We call anything beautiful which gives us pleasure, and that depends as much upon ourselves as upon what is outside us. Perhaps the majority of people find the sea, for instance, most beautiful when it is blue, and specially love the blue Mediterranean, where the skies are clear and intensely blue, and so the sea is blue, too. Especially if someone has lived in Italy as a child, and has to live beside a grey sea when he is grown up, he will think that the grey sea is ugly, and that nothing can be so beautiful as the blue sea. But suppose a Scotsman who loved Scotland had to go and live in Italy. He might find the blue sea after a little while very uninteresting, and with too much of a glare in it, and only when he went home and saw the grey sea again would he find the sea beautiful. We are made in different ways, and grey may be just as beautiful as blue if you find the right persons to look at it, just as the cry of a baby may be found more sweet in someone's ears than the finest note of the finest singer that ever lived. Nothing is beautiful or ugly in itself, but "thinking makes it so."

The next Questions are on page 2073.

BLIND MILTON

This is a picture of Milton, the great English poet and statesman of the seventeenth century. While in the prime of his life, Milton became blind. Here we see him dictating a hymn to one of his daughters. His three daughters were taught to pronounce Latin so that they could read aloud to him, but they were never taught the meaning of the words. In fact, the poet sadly neglected their education, with the result that they were not always the most dutiful of children, and often refused to attend to their father's needs.



CARDINAL NEWMAN AND HIS FAMOUS HYMN

LEAD, KINDLY LIGHT

LEAD, kindly Light, amid the encircling gloom,
Lead Thou me on;
The night is dark, and I am far from home,
Lead Thou me on.
Keep Thou my feet; I do not ask to see
The distant scene; one step enough for me.

I was not ever thus, nor prayed that Thou
Shouldst lead me on;
I loved to choose and see my path; but now
Lead Thou me on;
I loved the garish day, and, spite of fears,
Pride ruled my will: remember not past years.

So long Thy power hath blest me, sure it still
Will lead me on,
O'er moor and fen, o'er crag and torrent, till
The night is gone;
And with the morn those angel faces smile,
Which I have loved long since, and lost awhile.

THE WRITERS OF THE HYMNS

CONTINUED FROM 1896

WHAT is a hymn? The word itself comes to us from the Greek, in which language it was *hymnos*, and meant a song, generally a song of praise. And that is what a hymn is, or should be, to-day, a song of praise and thanksgiving. Hymns have done more than most men's words in carrying comfort and joy to the hearts of people in sickness and sorrow, in doubt, danger, and anxiety. Many lives have been saved in scenes of peril when some brave soul has raised a voice to sing some sweet, simple hymn. The others have listened to the appeal and been comforted; they have gained confidence, and so been prevented from rushing into a panic in which they might all have perished. So the writers of hymns are very important people in the history of the world. Many of them are more important than they dream. One of our grand old hymns:

Let us, with a gladsome mind,
Praise the Lord, for He is kind,

was written by a boy! We have all sung it; millions of people have sung it during the last three hundred years. Yet how many of us have thought it was the work of a boy? It was written by John Milton, the great poet, when he was only fifteen, studying at St. Paul's School.

This hymn, though really old, seems almost young compared with some hymns sung every Sunday in every Christian land. The Jews sang hymns before Christ was born, and we still sing hymns written in Greek or Latin by the saints. The hymn beginning "O Jesu, Lord of heavenly grace" was written by St. Ambrose, who lived his noble life fifteen centuries ago. A more famous hymn, "The day is past and over," is a translation from the Greek, in which it was written centuries ago by St. Anatolius. That grand hymn "Christian, dost thou see them?" was written far back in the ages by St. Andrew of Crete. We still sing three hymns by St. Bernard of Clairvaux, others by St. Gregory the Great, St. John Damascene, St. Joseph of the Studium, Francis Xavier, and many other holy men whose life stories have come down to us through the ages. "We plough the fields and scatter," our harvest hymn, is from an old German author. "All people that on earth do dwell" was written so long ago that we are not certain that William Kethe, its supposed author, really did write it. The tune comes from a book printed in 1554.

All hymn-books ought to print the names of the authors of the hymns.

It is most interesting to know the name of the writer of some sacred song that we love. We think of the days and the place in which he wrote, and we understand the spirit in which he lifted up his heart. Take, for instance, that stirring hymn "Safe home, safe home in port," with Sir Arthur Sullivan's fine tune. We feel, as we sing the hymn, that these are the words of a man who lived in stirring times, and we are right, for the words are a translation from the Greek of St. Joseph of the Studium, who lived when Christianity was still struggling against the evil powers of the Roman Empire.

THE HYMNS THAT LED TO THE BIRTH OF THE PROTESTANT CHURCH

Martin Luther was a very great hymn-maker. He understood that the love of music, which the Jews had shown in their religious services, was not dead in men. He knew that to praise God in song was a natural desire of man, and he wrote hymns and chose tunes that would appeal to the heart and mind —tunes that were not so dull and unmusical as to be difficult and unpleasant to sing, nor yet of a character that would render them unfitting for religious services. "A sure stronghold is our God" is one of his best-known hymns.

The effect of Luther's hymns was marvellous. People wandered all over Europe singing them as they went. They were carried into the castle of the noble and into the cottage of the peasant. His hymns helped, even more, if that be possible, than his brave teaching, to free people from the beliefs in which they had up to then been held. Songs have always had great influence in exciting people to revolution as we see in the history of many countries

JOHN WESLEY AND HIS BROTHER CHARLES, WHO WROTE OVER 6,000 HYMNS

There are hundreds of thousands of hymns in existence, printed in hundreds of different books, and millions of these books are sold every year.

We owe a great debt for our hymns to the Wesley brothers. John Wesley, the great founder of the Methodist Church, of whom we read in another part of this book, wrote many hymns and translated many more; but while John Wesley is famous for his preaching, it is Charles Wesley, his brother and disciple, who is remembered by his hymns. It is not always easy to say which were John's hymns and which were Charles's, but we know that Charles wrote about 6,500 hymns. No other man ever had such a record as that. Of course, they are not all high-class poetry, but some of them are still among the noblest verses in the hymn-book. Take such of them as these: "Christ, whose glory fills the skies"; "Lo, He comes with clouds descending"; "Hark, the herald angels sing"; "The strife is o'er"; "Jesu, lover of my soul"; "O Love divine"—all the Christian world sings these. Charles was a great missioner, second only to his brother. He gave all his life to religious works, and refused a great fortune, because he did not think it right that the lady who proposed to leave it to him should forget her own family. He was born in 1707, and died when he was eighty-one.

DR. WATTS, THE INVALID SCHOOLMASTER WHOSE HYMNS WE ALL SING

In most hymn-books there are at least a dozen hymns by Dr. Isaac Watts. Many more might be included, and some others, not all so good, left out. He wrote over 500 hymns, among them such treasures as "When I survey the wondrous Cross"; "O God, our help in ages past"; "There is a land of pure delight"; and "Jesus shall reign where'er the sun." Watts was the son of a Southampton schoolmaster, and got his gift for poetry from his father. He became a tutor when he grew up, and then a minister, and received the degree of doctor of divinity from a Scottish university. He was taken ill when thirty-eight years old, and went for a rest to the home of Sir Thomas Abney at Theobalds, which he never left till he died, thirty-six years later.

A more recent writer of favourite hymns was Bishop William Walsham How, who was born in 1823 and died at the age of seventy-four. Among favourites from his pen are "Summer suns are glowing," "We give Thee but Thine own," and "Who is this so weak and helpless?" It is natural to find preachers among the hymn-writers, but the result is that some of the hymns they write are not sung by all congregations.

Christian people do not all believe quite the same things, and as some

hymns express views of only one Church, such hymns are sung only in that Church. John Mason Neale, a scholar and true poet, wrote some of the most beautiful hymns, but they are not generally sung. Still, some of them are for all the world, such as "O love, how deep, how broad"; "For thee O dear, dear country"; "Jerusalem the golden"; and his translation from the Greek of "The day is past and over." Neale was a Church of England minister, very poor, but noble-hearted, though so extreme in his views that he got into trouble with his bishop and had to give up his pulpit.

The authors of some of the finest poetry in the English language are unknown, and we have many fine hymns that cannot be traced to their writers. We have some written as they first appeared in English; we have some from unknown German and Italian authors, and nearly fifty from unknown Latin authors. Even where the name of the man is known, and his hymns are world-famous, sometimes no record of his life is preserved. In any good hymn-book are nearly fifty of John Ellerton's hymns, among them "Saviour, again to Thy dear Name we raise," and the beautiful "The day Thou gavest, Lord, is ended," yet not a word about his life is to be found in many of the great works which should tell us of such a man.

On the other hand, we know rather too much about Nahum Tate, the author of the immortal hymn "While shepherds watched their flocks by night." He lived in an age when it was not considered disgraceful to drink, and he was a drunkard. He was born the son of a Dublin clergyman, and became Poet Laureate of England. It is strange that such a man should have taken to writing poetry on sacred subjects. Yet it is only by his sacred writings that he is remembered! Perhaps it was his better nature that appeared in his hymns. He had a partner named Nicholas Brady, and together they produced a version of the Psalms which was long sung in many churches.

We find a brighter picture in the life of Bishop Reginald Heber, a more gifted poet than Tate, and author of "From Greenland's icy mountains,"

George Herbert, the poet and hymn-writer, in his garden at Bemerton: from the painting by William Dyce, R.A.

"Holy, Holy, Holy," and "The Son of God goes forth to war." Heber was born in 1783, and after he had left Cambridge University he had before him the chance of an easy life as a country clergyman. But he scorned such an existence. He preferred the perils and anxieties of mission work in India, and ended his days as Bishop of Calcutta, when only forty-three.

Another hymn-writer who died when forty-three was Sarah Flower Adams, born in 1805. She gave to the world the lovely hymn "Nearer, my God, to Thee." She was a beautiful woman, with a vivid imagination and fine powers as a writer. Once in her life she thought of going upon the stage, but happily she gave herself to nobler things, and devoted her powers to literature and works of religion. Another of the best of our hymns, "Our Blest Redeemer ere He breathed," was written by a woman, Harriet Auber. That was in 1823, since when it has been translated into every language belonging to Christian peoples.

THE WOMEN WRITERS OF SOME OF THE WORLD'S FAVOURITE HYMNS

Two other favourites that have rung throughout the world, "There is a green hill far away" and "Once in royal David's city," are the work of a woman's heart and brain, Mrs. Cecil Frances Alexander, who was born in 1818, and married, when forty-two, the Archbishop of Armagh. She died in 1895. Frances Ridley Havergal, like Bishop Heber and Mrs. Adams, wrote many hymns which will long be sung; the most famous are "Thy life was given for me" and "Take my life and let it be." She had musical talent, and studied for some years in Germany, where she thought of making music, instead of writing, her chief aim in life. She was born at Astley rectory, Worcestershire, in 1836, and died in 1879.

For another of the most famous hymns, "Just as I am, without one plea," we owe thanks to Charlotte Elliott, a member of a clever family, who was born in 1789. As a young woman she gained some fame by writing comic verses, but then came an illness and serious thoughts. Afterwards she gave all her talent to writing beautiful verses on religious subjects, and her works did great good.

The Moody and Sankey hymns are sung by millions of people all over the world. The book is not made up of hymns by the two revivalists. Sankey wrote the words of a few, and composed the music of many, but the bulk of the hymns are by other authors and composers.

THE STORY OF MOODY AND SANKEY AND THEIR FAMOUS HYMN-BOOK

They were two remarkable men. Dwight Lyman Moody was born in Massachusetts in 1837, and from early boyhood, until the age of seventeen, he laboured on a farm. Then he became a clerk in a shoe-store. While in Chicago he spent much of his life in preaching to young men, and during our Civil War he acted as a missionary in the army.

When he was thirty-six he made the acquaintance of Ira David Sankey, a Pennsylvanian, three years younger than Moody. Sankey was the son of a banker, and in a better position than Moody had been, but he was an earnest Christian worker, who, though he could not preach like Moody, was a good singer and musician. The two men entered together on a mission. They preached all over America and visited England and Australia, and, though their methods seemed strange, they made a great impression and did great good by their services.

It was for these services that Sankey got together the famous Moody and Sankey hymn-book. The words of Sankey's own hymns have not the splendour of some others, but they reach the heart; and the tunes that he composed, though they are not so beautiful as many of the hymn-tunes which Sir Arthur Sullivan composed, are tunes which anybody with an ear for music can learn and remember.

THE BRAVE BLIND WOMAN WHO WROTE "SAFE IN THE ARMS OF JESUS"

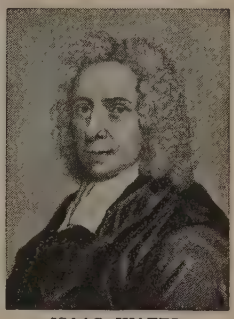
Many of the hymns in "Sankey" bear the name "F. J. Crosby." The bearer of that name was a brave and cheerful blind woman. Frances Jane Crosby, a very noble woman, lost her sight as a baby, and never regained it. She received her education at a school for the blind, and devoted her life to making others good and happy. She wrote over three thousand hymns, of which one, "Safe in the arms of Jesus," has been sung all over the world.

THE WRITERS OF SOME FAMOUS HYMNS

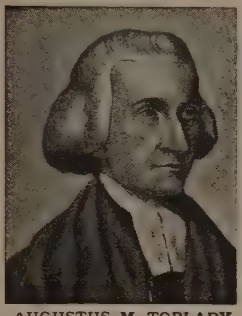
MARTIN LUTHER
who wrote
"A sure stronghold is our God"

JOHN MILTON
who wrote, as a boy,
"Let us with a gladsome mind"

BISHOP KEN
who wrote
"Glory to Thee, my God, this night"

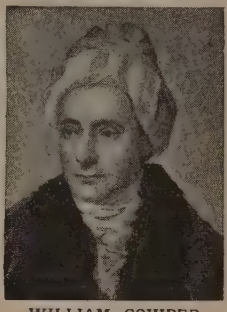


ISAAC WATTS
who wrote 500 hymns, including
"O God, our help in ages past"



AUGUSTUS M. TOPLADY
who wrote
"Rock of ages, cleft for me"

JOHN WESLEY AND CHARLES WESLEY
the founders of Methodism,
who wrote many thousands of hymns still sung all over the world



WILLIAM COWPER
who wrote
"God moves in a mysterious way"

BISHOP HEBER
who wrote
"From Greenland's icy mountains"

JOHN KEBLE
who wrote
"Sun of my soul, Thou Saviour dear"

SIR JOHN BOWRING
who wrote
"In the Cross of Christ I glory"

HENRY FRANCIS LYTE
who wrote
"Abide with me"

FRANCES HAVERGAL
who wrote
"Take my life, and let it be"

D. L. MOODY AND IRA D. SANKEY
the well-known American evangelists,
whose collection of hymns is used by religious assemblies everywhere

BISHOP HOW
who wrote
"Summer suns are glowing"

The photographs of Frances Ridley Havergal and Bishop How are by Elliott & Fry, and that of Ira D. Sankey by Russell

Everyone who reads in history the trial of the seven bishops, the brave men who refused to sacrifice their religious beliefs upon the order of a king, will sing with greater pleasure the fine old hymns "Awake, my soul, and with the sun," and "Glory to Thee, my God, this night," when they remember that the writer of them was William Ken, the famous bishop, who formed one of the valiant seven.

Ken had the advantage of studying the works of George Herbert, who wrote some of the finest religious poems in existence. He was born in 1593 and died at the age of forty. As a brother of Lord Herbert he hoped to win Court favour. Luckily he did not, but gave himself up to an earnest ministry in the Church, and to poetry. It is surprising that more of his hymns do not appear in the hymn-books. He died four years before Bishop Ken was born.

Many famous names appear among the hymns we may call modern. William Cowper, the poet, wrote "God moves in a mysterious way" and "Hark, my soul, it is the Lord." Sir Robert Grant, who was a great scholar, a Governor of Bombay, and for years a member of Parliament, wrote "O worship the King."

THE AMBASSADOR WHO WROTE A FAMOUS HYMN AND INVENTED THE FLORIN

Sir John Bowring wrote "In the Cross of Christ I glory." Bowring's life-story would make a good book. He was one of the most wonderful linguists that ever lived. He could speak a hundred languages, and read twice as many. He translated into English all the foreign songs and poems he could find. He travelled far and wide. He wanted to change the English money system into a simple one; and the two-shilling piece remains to-day to remind us of the work that he began. He invented the florin, and it remains one of their most convenient coins. But when acting as Ambassador, Bowring caused a war between China and England over quite a little matter.

The memory of James Drummond Burns, a Free Church minister, lives in the beautiful "Hushed was the evening hymn." He was a Scotsman, born in 1823, and he lived for some years in Madeira, and afterwards in London. "Rock of ages" serves to remind us of Augustus Montague Toplady, a clergyman who died more than a century ago; and the beautiful prayer for those in peril on the sea, "Eternal Father, strong to save," makes the name of William Whiting dear to us all.

Very few men receive such affectionate tributes as are paid to Henry Francis Lyte, an English clergyman, who has lain in his tomb at Nice since 1847.

THE EVENTIDE OF THE ENGLISH CLERGYMAN WHO WROTE "ABIDE WITH ME"

Among the hymns that Mr. Lyte wrote was "Abide with me." He wrote it on the night that he preached his last sermon, thinking, not of that one night's repose, but of his eternal rest. Now we sing it at the close of evening service in church and chapel all over the world. Thousands of people have travelled to Nice as pilgrims to the grave of the man who wrote this hymn.

One of the hymns with a history is that most beautiful one "Lead, kindly Light." It was written by John Henry Newman while he was on the sea. He was a brilliant man in the Church of England, greatly beloved and admired for his beautiful character and his great gifts. But doubt came upon him, and it was while he doubted that he wrote this hymn. Afterwards he left the Protestant Church, and became, as a Roman Catholic, Cardinal Newman. At Oxford University, at the same time as Newman, was another gifted scholar and poet, John Keble, the author of "Sun of my soul," a hymn almost as famous as Newman's. Keble College, Oxford, is named after him.

"ALL HAIL THE POWER OF JESU'S NAME" AND "NOW THE DAY IS OVER"

In the same way the hymn "All hail the power of Jesu's name" keeps fresh the memory of Edward Perronet, though he has been dead more than a century. He was a friend of the Wesleys, and worked with them for a time.

Two very different hymns have been written by Mr. Baring-Gould, who is still among us. One is "Onward, Christian soldiers," a battle-hymn with a war-like spirit which many people do not like; the other is "Now the day is over," a peaceful little lullaby hymn which children sing at the end of the day's play. Mr. Baring-Gould is a clergyman who has written many books.

The next stories of Men and Women begin on page 2113.

HOW THE LION-HEART FORGAVE

CONTINUED FROM 1914

RICHARD THE LION-HEART is famed for his bravery in battle, for his dauntless courage and resource, and for his devotion to the cause of the Crusaders; but he showed that he was capable of something finer than mere physical bravery. He could forgive an enemy and act generously towards him.

His brother John did everything he could to injure Richard, and to take his place on the throne; yet when his mother interceded for John, Richard forgave him. Little wonder that a man of such frank, generous nature was adored by his soldiers, and won the chivalrous esteem of his enemy, Saladin the Saracen.

Perhaps Richard Lion-Heart's readiness to forgive is most clearly shown in the treatment of the rebel who gave him his death-wound. Vidomar, Viscount of Limoges, had found a treasure on his land, but would not give up a portion to Richard, who, as his lord, could claim it. So Richard went to besiege the Castle of Chaluz, where Vidomar lived. There, while Richard was one day riding round the walls to see where there was the most likelihood of making a breach in them, a young man, Bertrand de Gurdun, standing on the ramparts, recognised him, and shot an arrow, which struck the king's shoulder. The wound was a slight one, but it was treated badly, and in the end was to prove mortal. The castle was taken, and then Bertrand de Gurdun was found and brought to Richard's bedside.

"Wretch," said the king, "what harm did I do thee, that thou shouldest seek to take my life?"

"With your own hand you killed my father and my two brothers," was the reply. "Take what revenge you choose. I will endure the greatest torment so that you, who have wrought so many evils in the world, meet with your death."

But Richard would not hurt the young man, and said gently: "I forgive thee." Then, turning to his attendants, as shown in the picture, he added: "Loose his chains, and give him a present of a hundred shillings."

Yet the young man only scowled and demanded the sword, refusing to take advantage of the king's clemency.

"Live on by my bounty," whispered the dying king.

But Gurdun never regained his freedom, as Richard's attendants had no pity on him, and soon after he was put to death.

For all that, Richard's mercy to his assassin shows how a brave soldier was also pitiful and forgiving.

A FRUGAL HERO OF ANCIENT ROME

ROME became a great power because her citizens were honest, single-minded men who worked hard, loved their country, governed it wisely and fought for it bravely. In its early days the little state was surrounded by enemies, and men would be called from their farms outside the city to defend it against the Volscians, Samnites, and other peoples.

One of the bravest of these early Romans was the farmer-statesman Curius Dentatus, who fought against Pyrrhus and was also victorious over the Samnites in their valleys high among the rugged Apennines. He won the esteem of his fellow-countrymen so that they three times elected him consul, or a ruler of the state, and twice gave him a triumph—a great honour for a Roman.

But when the fighting was over, Dentatus would go back to his farm, and work there with his own labourers in the fields until his country called for him again; for he was a man of sturdy, self-respecting character, living a simple country life, for whom luxury and ease had no attraction.

CURIUS DENTATUS REFUSING A BRIBE IN ROME

It is said that the Samnites once sent messengers to him with valuable presents of gold in the hope of bribing him over to their side. They found him seated in a field cooking a meal of turnips in an earthen pan. When Dentatus saw the gold, he refused it with contemptuous laughter, saying he wished to command those who lived in plenty while he himself continued in poverty, and that he was neither to be overcome in battle nor bribed by money. So the Samnites, shame-faced, had to take back the presents they had brought.

It was men of this type who built up the great Roman Empire, for they first learned the secret of ruling themselves and put honour before wealth. In their hands the state was safe, but when love of gain and pleasure became the heart's desire of the Romans their empire fell.

THE NEXT GOLDEN DEEDS BEGIN ON PAGE 2403

GRAY'S ELEGY

WRITTEN IN A COUNTRY CHURCHYARD

THOMAS GRAY, the author of this beautiful elegy, was a great scholar, but he did not write very many poems. The churchyard about which he wrote is that of Stoke Poges, in Buckinghamshire, of which a picture is given above as it was in the time of the poet. Gray died in 1771, and was buried in this churchyard. The "Elegy Written in a Country Churchyard" is one of the most perfect poems in the English language. The meaning of an "elegy" is told on page 343.

CONTINUED FROM 1885

THE curfew tolls the knell of parting day,
The lowing herds wind slowly o'er the lea,
The ploughman homeward plods his weary way,
And leaves the world to darkness and to me.

Now fades the glimmering landscape on the sight,
And all the air a solemn stillness holds,
Save where the beetle wheels his droning flight,
And drowsy tinklings lull the distant folds:

Save that from yonder ivy-mantled tower,
The moping owl does to the moon complain
Of such as, wandering near her secret bower,
Molest her ancient solitary reign.

Beneath those rugged elms, that yew tree's shade,
Where heaves the turf in many a mouldering heap,
Each in his narrow cell for ever laid,
The rude forefathers of the hamlet sleep.

The breezy call of incense-breathing morn,
The swallow twittering from the straw-built shed,
The cock's shrill clarion, or the echoing horn,
No more shall rouse them from their lowly bed.

For them no more the blazing hearth shall burn,
Or busy housewife ply her evening care:
No children run to lisp their sire's return,
Or climb his knees the envied kiss to share.

Oft did the harvest to their sickle yield,
Their furrow oft the stubborn glebe has broke;
How jocund did they drive their team a-field!
How bowed the woods beneath their sturdy stroke!

Let not Ambition mock their useful toil,
Their homely joys, and destiny obscure;
Nor Grandeur hear with a disdainful smile
The short and simple annals of the poor.

The boast of heraldry, the pomp of power,
And all that beauty, all that wealth ere gave,
Await alike the inevitable hour:
The paths of glory lead but to the grave.

Nor you, ye proud, impute to these the fault,
If Memory o'er their tomb no trophies raise,
Where through the long-drawn aisle and fretted vault
The pealing anthem swells the note of praise.

Can storied urn or animated bust
Back to its mansion call the fleeting breath?
Can Honour's voice provoke the silent dust,
Or flattery soothe the dull cold ear of Death?

Perhaps in this neglected spot is laid
Some heart once pregnant with celestial fire;
Hands that the rod of empire might have swayed,
Or waked to ecstasy the living lyre.

But Knowledge to their eyes her ample page
Rich with the spoils of time did ne'er unroll;
Chill Penury repress'd their noble rage,
And froze the genial current of the soul.

Full many a gem, of purest ray serene,
The dark unfathomed caves of ocean bear:
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air.

Some village Hampden, that with dauntless breast
The little tyrant of his fields withstood;
Some mute inglorious Milton here may rest,
Some Cromwell, guiltless of his country's blood.

Th' applause of list'ning senates to command,
The threats of pain and ruin to despise,
To scatter plenty o'er a smiling land,
And read their history in a nation's eyes,

Their lot forbade: nor circumscribed alone
Their growing virtues, but their crimes confined;
Forbade to wade through slaughter to a throne,
And shut the gates of mercy on mankind;

The struggling pangs of conscious truth to hide,
To quench the blushes of ingenuous shame,
Or heap the shrine of Luxury and Pride,
With incense kindled at the Muse's flame.

Far from the madding crowd's ignoble strife
Their sober wishes never learned to stray,
Along the cool sequester'd vale of life
They kept the noiseless tenor of their way.

Yet e'en these bones from insult to protect,
Some frail memorial still erected nigh,
With uncouth rhymes and shapeless sculpture decked,
Implores the passing tribute of a sigh.

Their name, their years, spelt by the unlettered Muse,
The place of fame and elegy supply:
And many a holy text around she strews,
That teach the rustic moralist to die.

For who, to dumb Forgetfulness a prey,
This pleasing anxious being e'er resigned,
Left the warm precincts of the cheerful day,
Nor cast one longing, lingering look behind?

On some fond breast the parting soul relies,
Some pious drops the closing eye requires;
E'en from the tomb the voice of nature cries,
E'en in our ashes live their wonted fires.

For thee, who, mindful of the unhonoured dead,
Dost in these lines their artless tale relate;
If chance, by lonely Contemplation led,
Some kindred spirit shall inquire thy fate;

Haply some hoary-headed swain may say,
"Oft have we seen him at the peep of dawn
Brushing with hasty steps the dews away,
To meet the sun upon the upland lawn.

"There, at the foot of yonder nodding beech,
That wreaths its old fantastic roots so high,
His listless length at noontide would he stretch,
And pore upon the brook that babbles by.

"Hard by yon wood, now smiling as in scorn,
Muttering his wayward fancies he would rove;
Now drooping, woeful—wan, like one forlorn,
Or crazed with care, or crossed in hopeless love.

"One morn I missed him on the 'customed hill,
Along the heath and near his favourite tree;
Another came; nor yet beside the rill,
Nor up the lawn, nor at the wood was he;

"The next, with dirges due in sad array
Slow through the church-way path we saw him borne;
Approach and read (for thou canst read) the lay
Graved on the stone beneath yon aged thorn."

THE EPITAPH.

Here rests his head upon the lap of Earth,
A Youth, to Fortune and to Fame unknown;
Fair Science frowned not on his humble birth,
And Melancholy marked him for her own.

Large was his bounty, and his soul sincere,
Heaven did a recompense as largely send:
He gave to Misery all he had—a tear,
He gained from Heaven ('twas all he wished) a friend.

No farther seek his merits to disclose,
Or draw his frailties from their dread abode
(There they alike in trembling hope repose),
The bosom of his Father and his God.

THE PILGRIM

We are already familiar with John Bunyan as a writer of prose, having read his "Pilgrim's Progress" on page 1115. He could also write poetry, though not with so much distinction as he could tell a story. This is one of several short pieces of verse which appear in "The Pilgrim's Progress."

Who would true valour see,
Let him come hither!
One here will constant be,
Come wind, come weather:
There's no discouragement
Shall make him once relent
His first-avow'd intent
To be a Pilgrim.

Whoso beset him round
With dismal stories
Do but themselves confound;
His strength the more is.
No lion can him fright;
He'll with a giant fight;
But he will have a right
To be a Pilgrim.

Nor enemy, nor fiend,
Can daunt his spirit;
He knows he at the end
Shall Life inherit:
Then, fancies, fly away;
He'll not fear what men say;
He'll labour, night and day,
To be a Pilgrim.

HOME-THOUGHTS FROM ABROAD

Few verses of Robert Browning's are more often quoted than the first eight lines of the following little poem, which is instinct with the pathos of the Englishman who is away in foreign lands and dreams of the loveliness of his own home-land when the sweet days of springtime have come again.

OH, to be in England
Now that April's there,
And whoever wakes in England
Sees, some morning, unaware,
That the lowest boughs and the brushwood sheaf
Round the elm-tree bole are in tiny leaf,
While the chaffinch sings on the orchard bough
In England—now!

And after April, when May follows,
And the white-throat builds, and all the swallows! [hedge
Hark, where my blossomed pear-tree in the
Leans to the field and scatters on the clover
Blossoms and dewdrops—at the bent spray's edge—
That's the wise thrush; he swings each song twice over,
Lest you should think he never could recapture
The first fine careless rapture! [dew,
And though the fields look rough with hoary
All will be gay when noontide wakes anew
The buttercups, the little children's dower,
Far brighter than this gaudy melon-flower!

O CAPTAIN! MY CAPTAIN!

This poem is one of the finest tributes ever paid to the great President, Abraham Lincoln, and it was composed by Walt Whitman, the eccentric poet.

O CAPTAIN! my Captain! our fearful trip is done,
The ship has weathered every rack, the prize we sought is won; [exulting,
The port is near, the bells I hear, the people all
While follow eyes the steady keel, the vessel grim and daring;
But, O heart! heart! heart!
O the bleeding drops of red,
Where on my deck my Captain lies,
Fallen cold and dead.

O Captain! my Captain! rise up and hear the bells;
Rise up—for you the flag is flung—for you the bugle trills,
For you bouquets and ribboned wreaths—for you the shores a-crowding,
For you they call, the swaying mass, their eager faces turning;
Here Captain! dear father!
This arm beneath your head!
It is some dream that on the deck
You've fallen cold and dead.

My Captain does not answer, his lips are pale and still,
My father does not feel my arm, he has no pulse nor will,
The ship is anchored safe and sound, its voyage closed and done,
From fearful trip the victor ship comes in with object won;
Exult, O shores, and ring, O bells!
But I, with mournful tread,
Walk the deck my Captain lies,
Fallen cold and dead.

THE STAR-SPANGLED BANNER

The national anthem of the United States was composed by Francis Scott Key, while a prisoner in a British war ship, during the War of 1812. Through the smoke, he saw the United States flag unfurled and floating from Fort McHenry, near Baltimore, and was so thrilled by the sight of the familiar emblem that he composed this poem.

O! SAY, can you see, by the dawn's early light,
What so proudly he hailed at the twilight's last gleaming—
Whose broad stripes and bright stars, through the clouds of the fight,
O'er the ramparts we watched were so gallantly streaming?
And the rocket's red glare, the bombs bursting in air,
Gave proof through the night that our flag was still there;
O! say, does that star-spangled banner yet wave
O'er the land of the free, and the home of the brave?

On that shore dimly seen through the mists of the deep,
Where the foe's haughty host in dread silence reposes,
What is that which the breeze, o'er the towering steep,
As it fitfully blows, now conceals, now discloses?
Now it catches the gleam of the morning's first beam,
In full glory reflected now shines on the stream;
'Tis the star-spangled banner; O! long may it wave,
O'er the land of the free, and the home of the brave!

And where is that band who so vauntingly swore
That the havoc of war and the battle's confusion
A home and a country should leave us no more?
Their blood has washed out their foul footsteps' pollution.
No refuge could save the hireling and slave
From the terror of flight, or the gloom of the grave;
And the star-spangled banner in triumph doth wave
O'er the land of the free, and the home of the brave.

O! thus be it ever, when freeman shall stand
Between their loved homes and the war's desolation!
Blest with victory and peace, may the heav'n-rescued land
Praise the power that hath made and preserved us a nation.
Then conquer we must, for our cause it is just,
And this be our motto—"In God is our trust;"
And the star-spangled banner in triumph shall wave,
O'er the land of the free, and the home of the brave.

GOOD-CHILDREN STREET

A POEM BY EUGENE FIELD

At the very beginning of our book, on page 92, we read one of the most beautiful children's poems ever written, "Wynken, Blynken, and Nod." No doubt many young readers now know it by heart, and they will not need to be told that "Good-Children Street," which was written by the same poet, Eugene Field, is also full of charming fancies and a great love of the simple delights of our childhood. In every poem he wrote he caught some of the charm of childhood.

THERE's a dear little home in Good-Children Street—
My heart turneth fondly to-day
Where tinkle of tongues and patter of feet
Make sweetest of music play;
Where the sunshine of love illumines each face,
And warms every heart in that old-fashioned place.

For dear little children go romping about
With dollies and tin tops and drums,
And, my! how they frolic and scamper and shout
Till bedtime too speedily comes!
Oh, days they are golden, and days they are fleet,
With little folk living in Good-Children Street.

See, here comes an army with guns painted red,
And swords, caps, and plumes of all sorts;
The captain rides gaily and proudly ahead
On a stick-horse that prances and snorts!
Oh, legions of soldiers you're certain to meet—
Nice make-believe soldiers—in Good-Children Street.

And yonder Odette wheels her dolly about—
Poor dolly! I'm sure she is ill,
For one of her blue china eyes has dropped out,
And her voice is asthmatic'ly shrill.
Then, too, I observe she is minus her feet,
Which causes much sorrow in Good-Children Street.

'Tis so the dear children go romping about
With dollies and banners and drums,
And I venture to say they are sadly put out
When an end to their jubilee comes.
Oh, days they are golden, and days they are fleet
With little folk living in Good-Children Street.

But when falleth night over river and town,
Those little folk vanish from sight,
And an angel all white from the sky cometh down
And guardeth the babes through the night,
And singeth her lullabies tender and sweet
To the dear little people in Good-Children Street.

Though elsewhere the world be o'erburdened with care,
Though poverty fall to my lot;
Though toil and vexation be always my share,
What care I—they trouble me not!
This thought maketh life ever joyous and sweet:
There's a dear little home in Good-Children Street.

From "Love Songs of Childhood," copyright, 1894, by Eugene Field, published by Charles Scribner's Sons.

THE HISTORY OF THE UNITED STATES

YOU were told in the last volume of the growth of the great West, and also how new states were made. You learned that some of the new states allowed slavery and some did not, and that often there was a fierce dispute over the question, as the South wished to keep the number of slave states equal to the number of free states. Now we are to learn that the South failed in this attempt and that the growth of the Republican party was thought to be dangerous to Southern interests. Then we learn of the great war which followed the attempt of eleven states to leave the Union and form a new nation. We shall find that often brother fought against brother, and that for four years one of the greatest wars in history was fought. Finally the Confederacy was overcome, the slaves were set free, and the states returned to the Union, but for several years afterward there was much trouble, as the negroes were made citizens, but did not know how to use their votes.

THE BROTHERS' WAR

CONTINUED FROM PAGE 1836

IN the last volume we followed the History of Our Land up to the point where our country reached to the Pacific Ocean. From thirteen states, all bordering on the Atlantic, it had grown into twenty-six states with a large amount of the territory not yet ready to be made into states. The population had grown from about 4,000,000 people into about 22,000,000 and the increase in wealth had been rapid.

Now we come to tell of the great war which was fought between the states. As the result, nearly a million men lost their lives and an immense amount of property was destroyed. But this war did not really begin in 1861, though the first battles occurred then. It began early in our history and in order to understand the war, we must go back and understand some other things first.

DISAGREEMENTS WHEN THE CONSTITUTION WAS MADE

We have learned in other volumes that there was jealousy between different sections at the time the Constitution was adopted. The Southern states were farming states, while the New England states were trading states, though manufacturing soon became important. The farming states wished to buy the goods they needed where they could get them cheapest, and wished them carried as cheaply as possible. The New England states wished laws putting a tax on foreign ships, so that they might get all the business.

On the other hand, some of the Northern states wished to give Congress power to forbid the bringing of any more negroes from Africa, to which some of the Southern states would not consent. So it was agreed that Congress might pass navigation laws, and might forbid the slave trade after twenty years. There were other disputes about whether slaves should be counted in laying taxes, and in deciding upon the number of Representatives in Congress a state should have. These were settled by counting five blacks as equal to three whites.

NORTH AND SOUTH WERE DIFFERENT FROM THE BEGINNING

Then there were differences in the people themselves. The settlers of the New England states came, for the most part, from the English towns, and they settled in many little towns. A large part of the settlers of Maryland, Virginia and the Carolinas came

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from the country and hoped to build up large estates in their new homes. After Charles I. was put to death in England, many of his followers came to Virginia. While some members of the English aristocracy settled in the North, and many men of Puritan ideas came to the South, we may say that New England was Puritan in sentiment and that the South was aristocratic in some sections, though not in all.

The farms in the North, except on the Hudson River, were small, while in the South there were many large estates. The wealthiest and most prominent people in the North lived in towns and made their money from commerce, while in the South this class lived on large plantations. Slave labour was not profitable in the North, while, after the invention of the cotton gin, many slaves could be employed in the South. The North turned early to manufacturing, while the South bought most of the manufactured goods it needed from the North or from Europe.

What the two sections wished to do

All these differences existed before the year 1800, and many men saw that the sections were likely to grow more unlike as the years went on. There were disputes about many things but the one which was most in the public eye was the question of slavery. The South thought it was more profitable to grow crops of cotton, rice, and tobacco than to build factories, but the people wished to buy goods as cheaply as possible. The first Congress put a tax on foreign goods, and the taxes were raised afterwards. These taxes helped the North to get higher prices for its manufactures, which the South thought unfair.

As we have told you before, all the colonies held slaves at first, but since slaves were not profitable in the North they were set free or sold. Few people anywhere thought slavery wrong, though many thought it unwise. One of the strongest enemies of slavery was Thomas Jefferson, though he owned slaves, and many other Southerners also wished to get rid of slavery, though no one could see exactly how it could be done, nor what would become of the negroes if they were set free.

You have already been told that the South tried to keep the number of slave states equal to the number of free states, and have been told of the Missouri Compromise, which was then thought to settle the question, but it was settled only for a short time. The cause of further trouble was the increase of the number of people called abolitionists. These abolitionists believed that slavery was wrong and ought to be abolished in spite of the Constitution and the laws.

The abolitionists begin to fight slavery

A newspaper to advocate this belief was started in 1812, and others were printed soon after. At first the abolitionists were not liked in the North any more than they were in the South. In Boston, Philadelphia and other cities, they were attacked and beaten when they tried to speak. In some places their printing offices were destroyed and some of the editors were killed by mobs. In 1833 a school for negro girls in Connecticut was broken up, and the teacher was sent to jail. The abolitionists did not stop speaking and writing, and after a time more and more Northern and Western people began to think as they did. In the South they were thought to be as dangerous as men with torches going around at night setting fire to houses.

After the Mexican War, of which you read on page 1832, the North wished to shut out slavery from the territory gained from Mexico, and wished to admit California as a free state. The South was not willing and the Compromise of 1850, which was introduced by Henry Clay, followed. This agreement admitted California as a free state, did not forbid slavery in the other territory, but did forbid any slave to be brought into the District of Columbia for sale, and declared that a stricter law for sending back runaway slaves to their masters ought to be passed.

How the fugitive slave law caused trouble

This Fugitive Slave Law, as it was called, was much disliked in the North and in many states was not obeyed.

When the officers of the law arrested runaway slaves, their prisoners were often taken from them by mobs, and the abolitionists declared that even if the Constitution did say that runaways must be sent back, there was a "higher law" than the Constitution, and that they were right to disobey the laws of Congress.

In many cases when the officers caught a runaway slave and tried to take him away, they had to be protected by troops. Mobs were urged by leaders, such as Theodore Parker, Wendell Phillips and William Lloyd Garrison, to attack the officers and rescue the slaves, and the whole matter was much talked about. All these attempts in the North to help runaway slaves made the South angry, and so the two sections grew further and further apart in sympathy and good feeling.

In the first fifty years of the Union many young men went from the South to Northern colleges and many Northern men went South to teach. But as the dislike and suspicion between the sections grew, this happened less frequently. The Southern people sent to England and France for their books and magazines, as they found themselves attacked in the Northern works. The disputes even entered some of the churches. The Methodists, Baptists and Presbyterians divided themselves into Northern and Southern branches, and so the people of the sections had less and less to do with one another.

THE KANSAS-NEBRASKA BILL INTRODUCED BY STEPHEN A. DOUGLAS

Now a dispute arose about what was called the Nebraska country. Senator Stephen A. Douglas, of Illinois, in 1854, reported a bill organising the two territories of Kansas and Nebraska, giving the inhabitants the right to say whether they wished slavery or not. He and those who voted with him said that the Missouri Compromise, which forbade slavery north of 36° 30′, had been done away with, and that the people of a territory knew best whether they wished slavery or not. This bill passed after a fierce discussion and both North and South sent men to Kansas, each trying to get the majority. For two years there was fighting, but finally the free state party got control. When the Kansas-Nebraska Act was passed, one abolitionist, William Lloyd Garrison, publicly burned a copy of the Constitution, saying, "The Union must be dissolved."

A NEW PARTY IS FORMED TO FIGHT SLAVERY

Other abolitionists did not believe this, and a new political party was formed to oppose slavery. This was made up of men from both the Whig and the Democratic parties who had come to believe that something must be done to prevent the spread of slavery. It was called the Republican party and grew very rapidly. One of the things which made many men join the new party was the "Dred Scott Decision" by the Supreme Court. This declared that Congress had no power to keep slavery out of a territory, that a state itself was the only body which could do this.

We have named no presidents after Polk. He was succeeded by General Taylor, the hero of the Mexican War, who soon died in office, and Millard Fillmore, the Vice-President, succeeded him. Then a Northern man, friendly to the South, Franklin Pierce of New Hampshire, became President. In 1856, James Buchanan of Pennsylvania, another friend of the South, was elected, though the Republican candidate, John C. Fremont, of whom you read on page 1830, carried most of the Northern states.

Until this time the South had generally controlled the government. From the beginning of Washington's first term until the Civil War was seventy-two years. During that time Southern presidents had been elected for terms amounting altogether to fifty-two years, while only five Northern presidents had been elected for one term each, or twenty years in all. Now the South knew that the North had increased so much faster in population, and the Republican party was growing so rapidly that it would soon be in control. Just then, in 1859, something happened to excite the South still more.

JOHN BROWN AT HARPER'S FERRY

John Brown had been engaged in the riots in Kansas, and had done his share of the bloody work there. He determined to stir up the slaves to rise against their masters. In 1859, with a few followers, he appeared near the village of Harper's Ferry, Virginia (now West Virginia), where the United States had an arsenal, or storehouse, for weapons of war. On the night of October 16th, 1859, he captured the arsenal, expecting that the slaves in the neighbourhood would soon flock to him. After being supplied with arms, they were to be sent out to burn the houses of the whites, and kill the men, women and children. Brown thought that this would frighten the Southerners so much that they would abolish slavery.

But things did not turn out as he expected. The negroes did not come to him, but the white men from the neighbourhood did, and surrounded the arsenal. Finally some United States marines were sent and he and his companions were captured. He was tried and hanged, but many of the abolitionists approved his plan, and called him a martyr. Nowadays most people believe that he was partly insane from thinking so long on the subject of slavery, and did not realise how terrible a thing he was trying to do.

In the South the story of John Brown's plan and the news of the fact that many people in the North approved of it, stirred up many people who had hoped that the quarrel between the sections could be settled, and more and more people began to talk of leaving the Union.

ABRAHAM LINCOLN IS ELECTED PRESIDENT, AND SOUTH CAROLINA SECEDES

When the time for electing another president came, in 1860, the Republicans nominated Abraham Lincoln, about whose life you may read on page 793. The Democratic party split into two parts, one nominating Douglas, and the other John C. Breckinridge, of Kentucky. Some other men, who called themselves the Constitutional Union Party, nominated John Bell, of Tennessee. Because of the number of candidates, Lincoln was elected though he did not get a majority of the votes.

As soon as it was known that Lincoln was elected the Governor of South Carolina called a convention to decide what that state would do. On December 20th, 1860, this convention repealed the act by which it had ratified the Constitution, seventy-two years before, and declared that the state was again a separate government. During the next six weeks Georgia, Alabama, Florida, Mississippi, Louisiana and Texas followed the example of South Carolina. The other states which allowed slavery were Maryland, Delaware, Virginia, North Carolina, Kentucky, Tennessee, Arkansas and Missouri. These states did not wish to secede, though they sympathised with the other slave states.

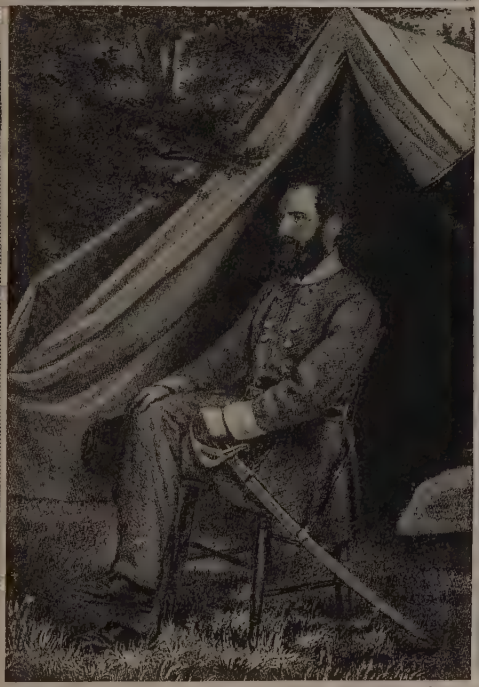
THE CONFEDERATE STATES GOVERNMENT IS ORGANISED

In February delegates from the seven seceding states met at Montgomery, Alabama, and organised a government called the Confederate States of America. Jefferson Davis, of Mississippi, was elected President, and Alexander H. Stephens, of Georgia, Vice-President. With a few changes they adopted the old Constitution. Nearly all the United States forts, shipyards and arsenals were taken, as it was said that a foreign government had no right to hold territory in their country. Fort Sumter in Charleston harbour, and a few others, had United States soldiers in them who were not willing to surrender.

Many of the officers of the army and navy, who had been born in the South, resigned and went to their native states. They said that a man's first duty was to his state and not to the nation. So we shall see that very often the opposing generals had been at West Point, together.

President Buchanan was an old man who loved the Union and could not bear to think of seeing it destroyed. He did not believe that a state had a right to secede, but at the same time he did not believe that the Union had any right to prevent it by force. So during the last months of his term he was very unhappy and did not know what to do. He did

FOUR CONFEDERATE LEADERS



These four men, all graduates of West Point, had most to do with the Confederate armies. Jefferson Davis had been Secretary of War in President Pierce's Cabinet. Robert E. Lee, before Virginia seceded, was offered the command of the United States army, but refused, and for four years fought for the independence of the Confederacy. Thomas Jonathan Jackson, better known as Stonewall Jackson, was Lee's most trusted lieutenant, and was perhaps the greatest military genius of the war. He was accidentally shot by his own men at Chancellorsville. Joseph E. Johnston was not a reckless officer and some thought him too cautious, but he was a skilful soldier and his soldiers trusted him.

send a ship with provisions for Fort Sumter, but when it was not allowed to land them, did not send an armed vessel to force admission.

WHY THE SOUTHERNERS THOUGHT THEY WOULD SUCCEED

Soon Lincoln was inaugurated President, but many efforts to prevent war were made. The men who had made the Confederacy did not believe that the North would fight, but if war did come, they thought that all the slave states would join them, that they would get much help from Northern men opposed to the abolitionists, and from Europe. They supposed that England could not do without their cotton, and would soon force the North to make peace. In all of these things they were disappointed, as we shall see.

Lincoln finally determined to send supplies and reinforcements to Fort Sumter. When the news reached the South, President Davis ordered General Beauregard to capture the fort. Firing was begun on Friday, April 12, 1861, and on Sunday afternoon the fort surrendered. Though it had been much damaged, and had been set on fire by the bursting shells, not a man was killed on either side. Five days later some Union troops marching through Baltimore were attacked by a mob and several were killed.

These two events were like a match in powder. Up to this time many men in the North had believed it better to let the states go if they insisted. Now everybody was in favour of war. In the Confederacy it was felt that they had gone too far to go back.

FOUR OTHER STATES SECEDE

The next day President Lincoln called for 75,000 men to volunteer as soldiers. Every state was called on for its part of that number. The slave states which had not seceded, were now forced to decide whether they would fight with the South or with the North. Virginia at once seceded, followed by Arkansas and Tennessee, and at last on May 20, 1861, North Carolina joined the Confederacy. Richmond was made the new capital and the Confederate government moved there.

Kentucky attempted to remain neutral, but this was not allowed, and the state stayed in the Union. In this state the people, and even families, were much divided. In many cases brothers fought on different sides. Missouri was also divided, but the Union men succeeded in preventing secession. Delaware and Maryland were north of Washington and stayed in the Union, though at first Maryland was restless. The western counties of Virginia were opposed to secession, and were made during the war into a new state called West Virginia.

THE NORTH AND SOUTH AT THE BEGINNING OF THE WAR

Now let us see something about the two sections. The eleven seceding states had about 9,000,000 people but about 3,500,000 of these were slaves. The nineteen free states and the four slave states which did not secede had about 22,000,000 people. The North had many mills, factories and ships; the South had very few as agriculture was the chief business.

You would think at first that the South would be beaten at once, but it had some advantages. In the first place nearly every Southern soldier could ride and shoot when he joined the army, and he knew also something about life in the open air. Many Northern soldiers had never fired a gun nor ridden a horse before they enlisted. Then too, the negroes could do many things which soldiers did in the Union army, such as driving wagons, taking care of horses and the like. Lastly, most of the battles were fought on Southern soil, and an invading army needs men to guard the road by which it gets its supplies. But in spite of all these facts the Union armies were much larger than the Confederate, and General Lee was finally forced to surrender because there were no more men for his army, while there were thousands to fill General Grant's.

THE UNION FORCES START FOR RICHMOND, BUT DO NOT GET THERE

When President Lincoln called for troops after the capture of Fort Sumter, they came quickly and soon the officers were drilling them around Washington. They were only a mob, for it takes time

to make soldiers, but the people of the North were impatient, and the newspapers and public speakers kept crying, "On to Richmond." The generals knew that the Union forces were not ready to fight, but many of the men had joined only for three months and their time was almost up. So on July 16, 1861, about 35,000 men under General Irvin McDowell marched out of Washington towards about 23,000 Confederates, commanded by General Beauregard, who had been at West Point with General McDowell. They met, July 21st, at a little stream called Bull Run, near the village of Manassas.

At first the Union forces seemed to be successful and the Confederates gave way, but General T. J. Jackson "stands like a stone wall," the Union troops were checked, and victory seemed trembling in the balance. Just then 8,000 fresh Confederate troops came up, the Union forces were thrown into a panic, and did not stop until safe in Washington. Some students of war think that Washington would have been captured if the Confederates had pursued, but this is doubtful.

This battle encouraged the Southerners and many thought that the war was over. It showed the North that the war would not be over in three months as had been expected. So General George B. McClellan, who had been successful in defending Western Virginia, was put in command and began to make an army out of the unorganised forces. In the West several small battles were fought, but except to keep Kentucky and Missouri from seceding, the Union forces did very little.

WHAT THE UNION FORCES WERE TRYING TO DO

We cannot name all the battles of the war which were fought in many states, but can tell only of the most important. The Union forces were trying to do several things: (1) to capture Richmond; (2) to blockade the Southern ports, thus preventing the Confederates from sending out cotton and bringing in supplies of all kinds, bought with the money thus gotten; (3) to gain the Mississippi River and in that way cut the Confederacy in two; (4) to drive the Confederates out of Kentucky, capture Tennessee, and so reduce the territory held by them.

Early in 1862 the Confederates held two forts in Tennessee, one, Fort Henry, on the Tennessee River, and the other Fort Donelson, on the Cumberland River, only fifteen miles apart. The first named was attacked, in February, 1862, by gunboats under Commodore Foote and troops under General U. S. Grant, whom we shall hear more about later. Fort Henry was easily taken, but the garrison escaped to Fort Donelson, which was then attacked. In a few days it too was taken and 15,000 men were captured. The capture of these forts forced the Confederates to give up most of Kentucky, and Tennessee, and was the first real Union success of the war. Six weeks later, Island No. 10, in the Mississippi, was also surrendered with 7,000 men.

THE BATTLE OF SHILOH WON BY BOTH SIDES

These were not the only contests in the West. General Grant moved to Pittsburg Landing on the Tennessee River, and stopped there with 45,000 men. General Albert Sidney Johnston with 40,000 men decided to attack him. General Johnston had had an unusual career. He had graduated at West Point in the same class with Jefferson Davis. In 1834 he resigned from the army, settled in Texas and soon became the commander of the Texan forces in the struggle for independence. After Texas was annexed to the United States, he won golden opinions in our war with Mexico. At Monterey, three horses were shot under him. After the war, he again joined the United States army, and led the army to Utah, about which you were told on page 1834. At the beginning of the Civil War, he resigned and was appointed a general in the Confederate army.

Without warning on April 6th he attacked the Union forces near Shiloh Church, drove them back to Pittsburg Landing and seemed about to capture the whole army, but was wounded and died fifteen minutes afterward. General Beauregard, the same who bombarded Fort Sumter, succeeded to the command,

but halted to rest his men. During the night the Union forces received 24,000 fresh men, and the next day Beauregard was forced to retreat. In a few weeks more the Confederates lost control of the Mississippi River down to Vicksburg in Mississippi. A large part of the Union plan had succeeded in the West.

How a Navy was Created

Now what of the blockade of southern ports? At the beginning of the war the navy was small and widely scattered, but every effort was made to increase it. Remember that this was before the days of iron ships. Now it takes several years to build a warship. Then anything which could carry guns was used. Merchant vessels, river steamboats, and even ferry boats ordinarily used to carry passengers between New York and Brooklyn became a part of the blockading fleet, and were called "double-enders." The Confederates had almost no navy at all, and did not have the workmen or the machinery to build one.

Late in 1861 Hatteras Inlet on the North Carolina coast, and Port Royal, in South Carolina, were taken, and also something happened which almost brought on a war with England. The Confederate government had sent James M. Mason and John Slidell to Europe to try to get England and France to recognise the independence of the Confederacy. They were taken from the British ship Trent by a United States warship and carried to Boston. England was very angry and if the men had not been given up at once might have declared war, though she had claimed the right to stop and search ships until 1856.

The Merrimac and the Monitor

When the United States Navy Yard at Norfolk was abandoned, a new vessel, the Merrimac, was sunk. The Confederates raised her, cut off her sides, added a sloping roof of iron, and renamed her the Virginia. On March 8th, 1862, she came out and destroyed the Cumberland and the Congress. The heavy shot of these ships made little more impression on her than tennis balls would have done. The next day when she came out to finish the destruction of the Union fleet, she was met by a little "cheese-box on a raft," which had arrived from New York the night before. This was the Monitor, also an ironclad of a new type, which had been invented by a man named Timby and improved by a Swedish engineer, John Ericsson. For five hours the two ships fired at each other. Neither could do the other much harm, but the Merrimac (or Virginia) was no longer so much dreaded and a few months later was destroyed by the Confederates when they gave up Norfolk. This battle made all the navies of the world almost worthless. Thereafter, wooden ships had no chance in battle.

Farragut Takes New Orleans

Another Union success was the capture of New Orleans by Admiral Farragut. This officer, though born in Tennessee, did not join the Confederacy, but April 24, 1862, led his fleet up the Mississippi River, in spite of the fire of Forts Jackson and St. Philip, and on the next day took possession of New Orleans.

But what of the Army of the Potomac which General McClellan had been drilling? For many months it remained quiet, but finally in March, 1862, General McClellan began to move toward Richmond, but by a very roundabout way. At Yorktown he was delayed for a month, and after the town was captured, found that some of the guns which looked so dangerous were painted logs of wood. Twelve thousand men had held back a hundred thousand. Slowly McClellan advanced toward Richmond and at one time was within four miles of the city, but waited for more men. Though we know now that General Joseph E. Johnston, in command of the Confederate army, had only 90,000 men to McClellan's 115,000, McClellan always thought that the opposing force was much larger than his own, and did not wish to fight until he felt he was sure to win.

Stonewall Jackson in the Shenandoah Valley

But he could not get more men because of Stonewall Jackson. That officer with a small force moved into the

TWO NAVAL BATTLES OF THE WAR

This was the first battle of iron ships in the world. The Merrimac was a regular frigate cut down, with a sloping roof of iron added. The turret of the Monitor revolved so that its two heavy guns could be fired in any direction. They met March 9, 1862, and fought for five hours. The Merrimac had easily destroyed the wooden ships Congress and Cumberland the day before, and but for the Monitor would have destroyed the whole Union fleet.

The most noted of the Confederate privateers was the Alabama, built and launched in England, in spite of the objections of the United States. Commanded by Captain Raphael Semmes, she almost drove the merchant vessels of the United States from the seas between 1862 and 1864. On June 19, 1864, she sailed out of the harbour of Cherbourg, France, to fight the United States vessel Kearsarge, and was sunk in less than two hours.

Shenandoah Valley to threaten Washington. He drove General Banks across the Potomac, and though three armies tried to capture him, he was always able to fight and then to escape. With less than 25,000 men altogether, he had beaten 60,000 at different times, alarmed Washington and saved Richmond.

Meanwhile General McClellan had been defeated at Seven Pines and Fair Oaks. General Johnston was wounded and was succeeded by General Robert E. Lee, who held the chief command on the Confederate side until the end of the war. After the Seven Days' Battle (June 26–July 2) McClellan was forced to retreat without capturing Richmond.

Next Lee turned to meet General Pope, who had been successful in the West, and now commanded the troops in front of Washington. With the assistance of Stonewall Jackson, Lee inflicted a crushing defeat at the old battlefield of Bull Run, and captured a large quantity of supplies. General Pope had boasted of what he was going to do too soon.

General Lee invades Union territory

General Lee now determined to invade Maryland, and at Sharpsburg (or Antietam) met McClellan, who had again been put in charge of the Army of the Potomac. The latter got a copy of Lee's plan of campaign but was too slow to use it. Though he had about 90,000 men to Lee's 50,000 neither general could really claim the victory, but General Lee changed his plans and returned to Virginia. More men were lost on this than on any other day during the war (September 17).

It seemed that Lee could not be beaten by a careful general, and so a reckless one, General Burnside, was next sent against him but was defeated with terrible slaughter at Fredericksburg, though his troops fought with wonderful bravery.

In the last months of the year there was again heavy fighting, in the West, in which the Union forces were generally successful. At Perryville, Corinth and Murfreesborough, the advantage was with them, though in some cases both sides claimed the victory. But on the other hand two attempts to capture Vicksburg failed.

President Lincoln sets the slaves free

The beginning of 1863 was marked by the Emancipation Proclamation on New Year's Day. In this President Lincoln declared all slaves in the seceded states to be free, but said nothing of those in the slave states which remained in the Union.

Still Richmond was not taken, and another general, "Fighting Joe" Hooker, was chosen to oppose Lee. The armies met at Chancellorsville, May 2, 1863. General Lee again divided his army and sent Stonewall Jackson to strike on the Union flank. The attack was successful but Jackson fell from the fire of his own men, who mistook his escort for Union cavalry, and Lee said that he had "lost his right arm." During the next three days he drove the Army of the Potomac back to the old camp.

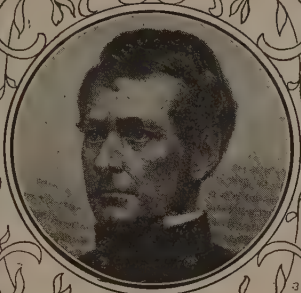
General Lee now made the mistake of again invading the North and marched into Pennsylvania. Hooker was succeeded by General George G. Meade. The armies met at Gettysburg and for three days (July 1, 2, 3) the battle raged. The first day the Confederate forces were successful and the second day also, but the Union forces had thrown up intrenchments, and early on the third day were able to regain the positions which had been lost. General Lee determined to break the Union centre and sent 13,000 men under Pickett and Pettigrew to do it. The charge was one of the most famous in all history. They did all that men could but the odds were too great, and the battle was lost. General Lee retreated almost undisturbed into Virginia, but in a little skirmish General Pettigrew was fatally wounded.

The Mississippi is opened by the capture of Vicksburg

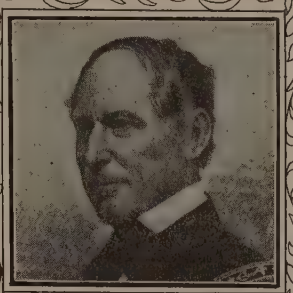
Though he had failed the year before, General Grant was determined to take Vicksburg and finally, July 4, 1863, the day after the victory at Gettysburg, the city surrendered. The Mississippi was now lost to the Confederacy. One of the great objects of the war was entirely accomplished. Arkansas, Louisiana and

UNION LEADERS IN THE CIVIL WAR

McCLELLAN



HOOKER



FARRAGUT

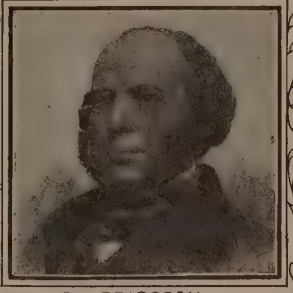
MEADE

SHERMAN

THOMAS

SHERIDAN

PORTER



ERICSSON

Here are nine leaders of the Union forces. Though McClellan could not win victories he organised the army which finally won. Hooker was a good officer, but no match for Lee. Farragut took New Orleans and Mobile, while Porter helped to take Vicksburg and Fort Fisher. Meade won at Gettysburg, Sherman marched through the Confederacy and Thomas saved the day at Chickamauga. Sheridan was Grant's right hand in Virginia, and Ericsson constructed the Monitor.

Texas were cut off from the rest of the Confederacy.

In Tennessee, however, the Confederates were more successful. At Chickamauga, the Confederate General Bragg, assisted by Longstreet, whom General Lee had sent to his aid, defeated General Rosecrans and the Union army would have been entirely routed but for General Thomas, who stood firm as a rock, though he lost many men. The Union army was now shut up in Chattanooga and besieged there, by the Confederate troops who occupied the hills surrounding the city. It seemed that Union success in the West had been checked.

General Grant was now placed in command of the armies in the West, reinforcements were hurried to the city, and in a series of battles, the Union forces were successful. Lookout Mountain, "the battle above the clouds," was fought on November 23rd, and the next day Missionary Ridge was also taken, and the Confederate army forced to retreat.

THE CONFEDERATE HOPES GO DOWN AFTER GETTYSBURG

Until Gettysburg and Vicksburg, Confederate success seemed possible, and the North was growing more and more tired of the war. From that time the Confederate cause sank. Thirty thousand men had been surrendered at Vicksburg, and the veteran soldiers lost at Gettysburg could not be replaced. Nearly every able-bodied man in the Confederacy was in the army and as they dropped out from death, disease or wounds, there were few to step forward to take their places. Clothing was scarce, and much of the time Lee's soldiers did not have enough to eat. Nevertheless they fought on desperately for nearly two years more.

With the beginning of the year 1864, a change was made in the Union plans. The armies had acted separately under orders from Washington. In the West the Confederates had been defeated, but in the East, they had been generally successful. So the man who had led the western armies to victory was brought to the East and placed in charge of all the armies of the United States.

GENERAL GRANT'S PLAN

His plan was simple; to keep hammering away in the East until he broke down the defences of Richmond, and to have General W. T. Sherman, in command of the army in the West, keep on attacking the Confederate army under General Joseph E. Johnston, until it had been destroyed. It was expected that the war would be ended during the summer of 1864.

All this seemed possible. The blockade of the Southern ports was now very close. Nearly every harbour was in possession of the Union fleet, thus cutting off all supplies from Europe. Mobile, on the Gulf of Mexico, Charleston, and Wilmington, which was defended by Fort Fisher, had not been taken, but fleets watched the entrances to capture blockade runners.

THE BLOCKADE RUNNERS

These blockade runners were low, swift steamers painted a dull slate colour in order to be as little noticed as possible. Carrying a cargo of cotton and showing no lights, they would slip out of the harbour on a dark night, and try to escape unnoticed through the blockading fleet. Once through they were seldom caught, and steamed swiftly to the British West Indies, where they unloaded their cotton and carried back manufactured articles of every kind, medicines and provisions. The return trip was arranged to approach the harbour at night. The most skilled pilots who knew every foot of the coast were in charge and many boats were able to slip through into the harbours. The profits of this trade were enormous. Cotton which could be bought in Wilmington or Mobile for a few cents a pound in gold was worth in England more than two dollars a pound and the goods taken into the Confederacy also brought large prices. A single successful trip would more than pay the cost of a boat, and even if only two or three trips were made, before the vessel was captured, the owners could easily afford to buy another boat from the profits.

One of the most famous blockade

runners was the Ad-Vance, purchased by Governor Vance, of North Carolina, for the service of the state. Before she was captured she had made nineteen successful trips, bringing in many articles which could not be gotten at any price in the South. Because of her success, the North Carolina troops were better clothed and fed than those of any other Southern state.

Mobile and Wilmington are Taken

Finally, in August, 1864, Mobile was taken by Farragut, who forced his way into the harbour in spite of the torpedoes, destroyed an ironclad vessel the Confederates had built, and captured the forts. Very few vessels could run the blockade at Charleston, though the city could not be taken by the Union fleet. At last (January 15, 1865), after a heroic defence, Fort Fisher was captured by a combined land and naval attack and the last port of the Confederacy was closed with the exception of Galveston, Texas, which was of little use.

Though the Confederacy had no regular navy, several steamers were sent out to destroy the commerce of the United States just as the United States had done to England during the War of 1812. The most famous were the Florida, the Alabama, the Georgia and the Shenandoah, which were fitted out in British ports, though the United States declared that this was an unfriendly act which a neutral nation ought not to allow. Altogether two hundred and sixty United States merchant vessels worth $20,000,000 were captured. All of these privateers, except the Shenandoah, were captured or destroyed before the end of the war. Later Great Britain paid over $15,000,000 for the damage done by these vessels as it was decided that she ought to have prevented them from leaving her ports.

High Prices in the South

There was little gold or silver in the Confederacy and the government issued paper money, which soon began to lose its value, until finally it was little more than waste paper. One soldier tells of giving a month's pay for a breakfast of ham and eggs. Before the war ended, a barrel of flour cost $1,500 in Confederate money, coffee brought from $50 to $100 a pound, and at the last could not be had at all. Many manufactured articles in daily use could not be had. Thorns with heads of wax served for pins, matches were not to be had, salt was scarce and brought $20 a bushel. Envelopes were made of wrapping paper or even of wall paper and when once used were turned and used again. Yet in spite of all these privations the great majority of the people believed that their independence would be acknowledged in the end.

Now let us go back to Northern Virginia in the spring of 1864, when Grant took command of the Union armies as general-in-chief. In May with more than 100,000 men he moved forward and met Lee with about 65,000 in a thinly settled section of Virginia, known as the Wilderness, on May 5th and 6th. He lost 18,000 men but could not drive back the Confederates. Instead of retreating as the other Union commanders had done, he moved to the left and on May 8th again found Lee in front at Spottsylvania Court House. For ten days there was constant fighting but Grant could not break through Lee's intrenchments, though he lost many men.

Cold Harbour, the Fiercest Battle

Again Grant turned to the left but found Lee in front of him at North Anna River, where hard fighting occurred with considerable loss. Again Grant repeated his old plan, and again found Lee in front of him at Cold Harbour with defences already constructed. On June 3rd, a desperate assault was made and seven thousand men were lost in an hour. In all the Union losses were about 10,000 while Lee lost hardly 2,000. Within five weeks Grant had lost about 60,000 men, a number almost equal to Lee's whole army, but as these dropped out thousands more were sent forward. Lee had lost a much smaller number but there were no more men in the Confederacy to fill his ranks. Grant knew this well, and declared himself satisfied. Even if he lost two men to

Lee's one, his force was so much larger that Lee must finally be overpowered.

But it was now seen that the cost of breaking Lee's line was too great and Grant swung around to the south of Richmond and began to besiege Petersburg. For months little was accomplished except that supplies coming from North Carolina to Lee's army were cut off, and the Union army settled down in winter quarters around Petersburg.

Sherman starts for Atlanta

But what had Sherman been doing? With 100,000 men, he was opposed by Joseph E. Johnston with about 65,000. General Johnston determined not to fight hard as Lee did, but to lead Sherman further South. Sherman also was unwilling to fight unless conditions were favourable. So Johnston retreated slowly, destroying railroads and bridges as he passed. Sherman followed and whenever Johnston fortified a position would send a part of his army around toward his rear and force him again to retreat. At last Johnston withdrew into the defences of Atlanta and prepared to defend the city.

The government of Richmond had grown impatient with Johnston's caution just as the government at Washington had grown impatient with McClellan two years before. So Johnston was removed and General John B. Hood was put in his place. But if Johnston had been cautious like McClellan, Hood was as reckless as Burnside. Between the middle of July and the first of September several battles were fought and Hood was forced to give up the city.

The march to the sea

Then he determined to move back into Tennessee, thinking Sherman must follow him. Sherman, however, divided his army, sent half under Thomas after Hood, and himself began his famous "March to the Sea," destroying the railroads and all provisions, shops, and factories in a strip of country sixty miles wide. There was no one to oppose him for only old men and boys were left. The able-bodied men were with Hood or Lee, or in the defences of Savannah.

Hood first met a part of Thomas's army under General Schofield at Franklin on November 30th and gained the advantage, but Thomas in Nashville did not attack, much to the disgust of Grant and President Lincoln. Finally when he was entirely ready he attacked, December 15th and 16th, and almost destroyed Hood's army.

The conduct of Sherman's army on the march

Meanwhile Sherman had continued his march toward Savannah, which he captured after a siege of two weeks and presented as a Christmas present to President Lincoln. After his men had rested for a month the army started northward toward Columbia, which was burned. The people of the city and many others believed that it was set on fire by the soldiers but General Sherman always denied this.

There has been the same dispute about the conduct of his army on the march. The Southern people declare that robbery, murder and violence of every sort were practised and that women and children were abused and ill treated by the soldiers, while General Sherman's friends have said that the charges were false. Probably most of the wickedness was done by the men called "bummers" who followed the army, and not by the soldiers, but not all the officers tried to prevent or punish these evil deeds.

We left the Army of the Potomac besieging Petersburg during the last months of 1864. With the hope of drawing Grant away Lee sent forces under Early to the Shenandoah Valley to threaten Washington, and at one time that officer was in sight of the city. Grant sent General P. H. Sheridan to oppose Early. In several battles Early was defeated and driven out of the Valley and Sheridan then laid waste that rich region so that it was said "that if a crow wished to fly down it, he must carry his provisions with him."

The net closes about Lee's army

Meanwhile the net was closing around Lee's army. Grant had two men to his

A SCENE ON SHERMAN'S MARCH TO THE SEA

After the capture of Atlanta General Sherman determined to cut loose from his line of supplies, destroy the railroad and march to Savannah, where he could communicate with the Union fleet. The march began November 16 and Savannah was captured December 20, 1864. His march was accompanied by thousands of vagrants called "bummers," who robbed right and left. Many negroes gathered up their scanty goods and followed the army. Railroads were destroyed, mills and factories burned, and all food not used by the army was destroyed on a strip of land sixty miles wide through the heart of Georgia. There was no force to oppose him, and this showed that the Confederacy could not endure much longer. This picture was made from the famous engraving drawn by Darley and engraved by Ritchie.

2021

one. Sherman was steadily approaching from the South, and then, besides, Lee's soldiers lacked food and clothing. It was plain that Richmond could not be protected any longer. The only hope lay in joining Johnston who had again been put in charge of the forces which had been shattered by Sherman and Thomas. If this could be done, Lee intended to retreat further South, and continue the contest.

The first attempt was made March 25, but though at first successful, the Union lines were too strong, and Grant moved a heavy body of troops to cut off a retreat. A week later Sheridan broke Lee's line at Five Forks, and captured 5,000 prisoners. The next day (April 2), Petersburg was attacked but could not be taken. That night Lee withdrew his men from Petersburg and Richmond. At Amelia Court House he found that a train load of supplies which he had ordered to remain there had by mistake been sent on to Richmond. His army had nothing to eat.

The Union army pressed on in pursuit, and Sheridan hurried ahead to get in front. For four days the Confederate soldiers had had no food except perhaps a handful of corn, and at last, on April 8, Lee realised that nothing more could be done. On April 9, 1865, he and Grant met at the little village of Appomattox and arranged terms for the surrender of 28,000 men — all that were left.

Meanwhile Sherman had reached Goldsboro, North Carolina, then moved to Raleigh. Finally, April 26, Johnston surrendered, and soon after the other forces of the Confederacy also gave up.

THE END OF THE CONFEDERACY

Jefferson Davis was captured by a squad of cavalry on May 10, near Irwinsville, Georgia, and imprisoned in Fortress Monroe under charge of treason. After a time he was released on bail and was never brought to trial.

The news of Appomattox had hardly spread over the United States when the terrible tale of the assassination of President Lincoln by John Wilkes Booth followed. This occurred in Ford's Theatre, in Washington, on the night of April 14, and the same night an attempt to kill William H. Seward, Secretary of State, was also made. It was thought at first that some of the Confederate leaders had had a part in the plot, but it was discovered that it was a mistake.

After the surrenders of Lee and Johnston the Confederate soldiers made their way to their homes to try to make a living for themselves and their families. In many cases they found their houses and barns burned, their cattle and horses gone, the towns in ruins, the railroads and the bridges destroyed. Many who had been wealthy before the war were reduced to poverty, and found it hard work to get employment as their neighbours were as poor as themselves. The outlook for the future seemed very dark. Many of the negroes thought that freedom meant that they would not have to work, and flocked to the towns, where they expected to be taken care of.

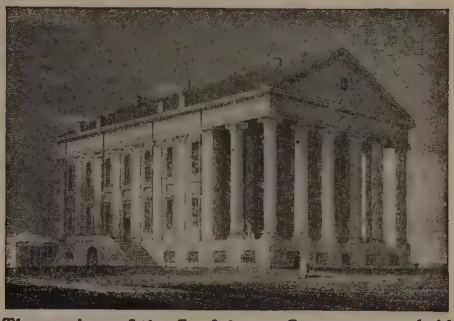
WHAT WAS TO BE DONE WITH THE SECEDING STATES

The first question to come up was what was to be done with the seceding states. The Thirteenth Amendment to the Constitution forbidding slavery anywhere under the United States flag had passed Congress before the end of the war and in December, 1865, became a part of the Constitution. That much was settled.

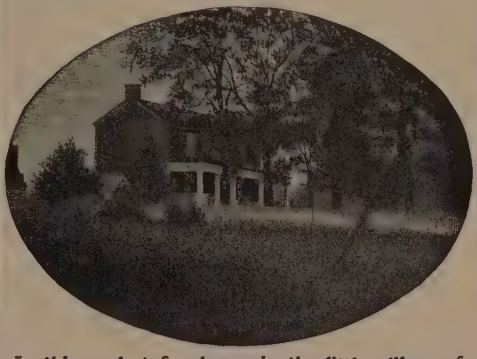
Now the North had said all the time that a state could not secede. If this were true then these states had the right to send Senators and Representatives to Congress, for they had never been out of the Union. Yet it was thought to be dangerous to give them this power as it was feared that they would ill-treat the negroes, and so several other ideas were advanced. One said that the states had committed suicide and so had become territories again. Another said that they were conquered provinces and that Congress might treat them as it would foreign territory. The fourth idea was that they were still states but had forfeited their rights.

THE BEGINNING AND THE END

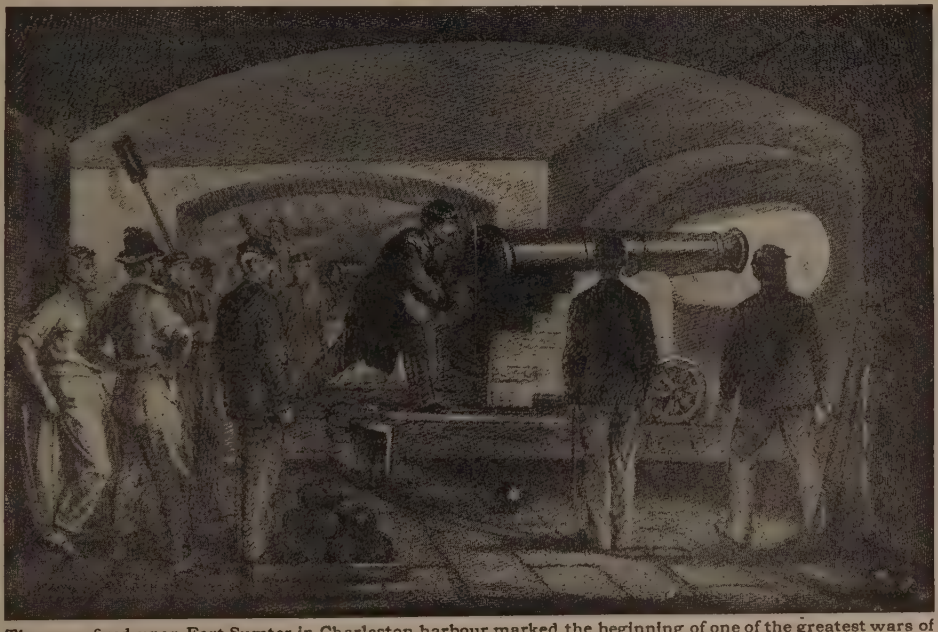
General Grant, after gaining success in the West, was made commander of all the Union armies. This picture, drawn by Nast, represents him in front of his tent in the field.



The sessions of the Confederate Congress were held in this building, planned for the capitol of Virginia by Thomas Jefferson.



In this modest farmhouse in the little village of Appomattox Court House, General Lee agreed to surrender his army.



The guns fired upon Fort Sumter in Charleston harbour marked the beginning of one of the greatest wars of modern times. Firing on the fort began April 12, 1861, and here we see the little garrison in the fort replying. The fort was almost destroyed, though not a man was killed. On April 14, Major Anderson surrendered his small force. From this time both North and South prepared for war, which all felt had now begun.

WHAT RECONSTRUCTION MEANT

Andrew Johnson, who had succeeded President Lincoln, at once attempted to admit the seceded states into the Union as fast as they formed new governments. Congress would not allow this, except in the case of Tennessee. At first the South was formed into five military districts and an army officer was placed over each of them. Each state was required to make a new constitution, giving the negroes the right to vote, and ratify the Thirteenth and Fourteenth Amendments. This was called Reconstruction. When this was done they were re-admitted to the Union at once, but many white men were not allowed to vote, though every ignorant negro was given the privilege. As a result the state officers were generally negroes or Northern white men. Some of these Northern men had gone South expecting to spend their lives there, but a much greater number were greedy adventurers who cared only for their own pockets. They were commonly called "carpetbaggers," and promised the negroes that the property of the whites would be divided among the former slaves, if they would vote for them.

As a result the government of the states was very corrupt and wasteful. There was much disorder, since the former slaves did not know how to use their power, and a secret society, the Ku Klux Klan, was organised among the whites. The members rode about the country at night in disguise and whipped and even killed some of the leading carpetbaggers and negroes.

At last the white people got possession of the state governments one by one, sometimes fairly, sometimes by force or by fraud, but the memory of the "Reconstruction Days" still lives, and this is the chief reason why the South has in so many things opposed the North since the war. The anger and the bitterness caused by the war might have been forgotten, but Reconstruction was worse than war.

THE PRESIDENT IS IMPEACHED

President Johnson was not liked by the Republican members of Congress, who tried to take all his power away from him, and he in turn opposed Congress in every way he could. At last the quarrel grew so bitter that he was impeached in 1868. According to the Constitution the Senators are the judges when a high officer of the government is tried on the charge of abusing his power. When the vote was taken thirty-five Senators voted guilty and nineteen not guilty. The Constitution says that to find a man guilty two-thirds must vote against him. So you see if one man had changed his vote, the President would have lost his office.

At the election in 1868, General Grant was the Republican candidate. He was elected, and again in 1872, for a second term. During his two terms there was much trouble in the South, for in some cases two men claimed the right to be governor of a state and United States soldiers interfered. All of this trouble kept the South from prospering and thousands of her citizens emigrated. There would have been more trouble but for the words and the example of General Lee, who advised all to submit themselves to the laws. He himself became president of a little college in Virginia, and remained there until his death.

TWO SIDES OF THE WAR

In one way we may be proud of the war, no matter whether we live in the North or in the South. No soldiers ever showed greater bravery than was exhibited in many of the twenty-four hundred battles of the war. While there was much that was cruel and hard, there were many bright spots, deeds of kindness and of heroism which will live for ever.

On the other hand the war seems horrible. Hundreds of thousands of young men lost their health, the chances for education, their limbs or even their lives. The bitterness caused by the war and the years after continued for many years and has not all died out yet, fifty years after the struggle began. But, as we look back and study the history of our country, it seems that in no way could it have been avoided; that sooner or later it had to come.

CONTINUED ON PAGE 2177

THE TALES OF CAPTAIN MARRYAT

CAPTAIN FREDERICK MARRYAT was born in London on July 10, 1792, and died in Norfolk, August 9, 1848. He was a naval officer who won fame as a writer of stories of the sea, which are full of high spirits, while the salt spray seems to blow through them, so true are they to life. "Midshipman Easy" is perhaps his best, but "Masterman Ready," "Peter Simple" and "Jacob Faithful" are all fine stories. "Masterman Ready" we give first, because it was written by Captain Marryat to entertain and instruct his own children, who had been so delighted with "The Swiss Family Robinson" that they wanted their father to continue it. Marryat found that the seamanship of that story and the natural description of the island were all wrong, so that he preferred to write an entirely new story. This we have in "Masterman Ready, or the Wreck of the Pacific," a book which takes its place by the side of "Robinson Crusoe."

MASTERMAN READY
OR THE WRECK OF THE PACIFIC

CONTINUED FROM 1763

WHEN we first meet Masterman Ready, he is a weather-beaten old seaman on board the big ship Pacific in the middle of the Atlantic. Ready had been more than fifty years at sea. When he was ten he had been bound apprentice on a coal ship that sailed from South Shields. Afterwards he served many years on a man-of-war.

Though still hale and active, he had been in every climate. In cases of difficulty and danger the captain would not hesitate to ask Ready's opinion, and frequently took his advice. On the Pacific he was second mate. This vessel was on her way to New South Wales with a valuable cargo of English hardware, cutlery, and other manufactures.

In addition to the crew, there was on board a family of the name of Seagrave. These were the only passengers. Mr. Seagrave had for many years held an office under Government in Sydney. He was the owner of some valuable property, and was now on his return to the colony with a variety of articles for the improvement of his estate. He was a clever man, but given to talking rather than doing. Mrs. Seagrave was an amiable woman, not in the most robust health. William, the eldest boy, was clever and steady, and soon made friends with Masterman Ready, who promised to tell him how he was once wrecked, in return for the story of "Robinson Crusoe," of which he had never heard. Thomas, who was six years old, was a very thoughtless if good-tempered boy, full of mischief, and always in a scrape. The two other children were Caroline, a girl of seven; and Albert, a little fellow, who, at the opening of the story, was not yet one year old. Albert was in the charge of a good-natured black girl named Juno. The party had with them two shepherd's dogs, named Romulus and Remus. There was also on board a little terrier, the favourite of the captain.

Soon after leaving the Cape the vessel encountered a terrific gale, which lasted some days. Several men were lost; Captain Osborn was rendered senseless by falling wreckage, and the ship began to leak badly.

When the captain was disabled, the sailors no longer felt themselves under control. They made up their minds to abandon the vessel and the passengers, and take their chance in the one boat that had been left undamaged by the gale. Old Ready decided to remain with the Seagraves; and, despite all the arguments of the other sailors, remain he did. Happily, the weather continued fair, after the crew had left the vessel, until they sighted an island, and Ready ran the Pacific aground.

His next thought was to repair the small boat that had been left to them.

"And when we get on shore?" queried Mr. Seagrave.

"Why," answered Ready, "where there are cocoa-nut trees in such plenty as there are on that island, there is no fear of starvation, even if we had not the ship's provisions. I expect a little difficulty with regard to water—for the island is low—very low and small—but we cannot expect to find everything exactly as we wish."

MASTERMAN READY GIVES GOOD ADVICE TO A GENTLEMAN IN DISTRESS

"I am thankful to the Almighty for our preservation, Ready; but, still, there are feelings which I cannot get over. Here we are, cast away on a desolate island, which perhaps no ship may ever come near, so that there is little chance of our being taken off. Here we may live and die; here my children may grow up—yes, grow old, after they have buried you, their father, and their mother, and follow us to the same tomb. All their prospects in life, all mine, all blasted, all my hopes overthrown. It is a melancholy and cruel fate, Ready, and that you must acknowledge."

"Mr. Seagrave, as an old man compared to you, I may venture to say that you are ungrateful to Heaven to give way to these repinings. What is said in the Book of Job? 'Shall we receive good of the Lord, and shall we not receive evil?' Besides, who knows whether good may not proceed from what appears evil?"

"You have reproved me very justly, Ready; and I thank you for it," replied Mr. Seagrave. "I will repine no more, but make the best of it."

MASTERMAN READY IS ASKED TO TAKE COMMAND OF THE SHIPWRECKED PARTY

"And trust in God, sir, who, if He thinks fit, will restore you once more to your friends, and increase tenfold your flocks and herds."

"That quotation comes very apt, Ready," replied Mr. Seagrave, smiling, "considering that all my prospects are in flocks and herds upon my land in New South Wales. I must put myself under your orders, for in our present position you are my superior—knowledge is power."

On landing, Ready and Mr. Seagrave decided to fix up a tent by a beautiful sandy cove, a quarter of a mile away. In addition to the three dogs, it may be mentioned that the live stock they had with them included two goats and a kid, several pigs, three or four pigeons, a cow, and a Merino ram and sheep. Juno proved very useful in the preparations for the encampment; but Master Tommy was soon in mischief. A musket, loaded, had been taken on shore and placed against a tree. When no one was looking, the boy pulled the trigger!

Ready, who was on the wreck with Mrs. Seagrave, pulled ashore as soon as he could with another musket, and in a great state of alarm. He found Mr. Seagrave and Juno busy with the tent, and Master Tommy sitting on the ground crying very lustily. It appeared that when the musket went off, its muzzle pointing upwards, the shot brought down two large cocoa-nuts, which fell close to where Tommy was, under the tree, and had they hit him would certainly have killed him. Mr. Seagrave, conscious of the alarm the shot would cause on the vessel, had been scolding him soundly, and the tears were shed to prove repentance. The incident is given as an example of the mischief Master Tommy was capable of making.

PREPARATIONS FOR DEFENCE AGAINST THE COMING OF THE SAVAGES

William and Ready, with the aid of the dogs, found water below the sand on another part of the island, and near here it was decided to build a house. When they had been on the island some time, Ready told the story of his life, and they were all very happy together, until the escape of two black women, who had arrived in an exhausted condition on the island, and whom they had befriended. Then there was a feeling of alarm at what might follow. They built a stockade, and prepared themselves against attack. One day their hopes of release mounted high, for a vessel was sighted. The flag of the Pacific was hoisted aloft; but apparently this was not seen, for the vessel went on its way.

Then one day the long-expected danger showed itself. A large number of canoes laden with savages was seen approaching. About this time William thought he saw another vessel under sail. The savages, after devoting themselves to

the old house, came up to the stockade. Happily the garrison were prepared. Juno handed up the muskets, which Mr. Seagrave, Ready, and William used to advantage. There was a fierce combat for an hour, when the savages drew off.

A SCENE AT THE SEASIDE IN THE DAYS OF THE PRESS GANG

At the beginning of the nineteenth century, during the time of Britain's wars with France, the British Navy was kept supplied with men by the Press Gangs, or companies of sailors sent ashore to capture men for service at sea. The taverns of the seaport towns were favourite places for finding victims of the Press Gang, as we see in this picture of life in the days of "Masterman Ready" and "Peter Simple."

In this interval a discovery was made that struck consternation into the hearts of the gallant little garrison. Ready had some time before this filled the water-tub. This was now found to be empty. Tommy was the cause of this disaster. There had been a washing, and he had been told to go to the well to fetch water for the purpose. He came back so soon that everyone called him a good boy. The fact was that he did not go to the well at all. He had fetched the water from the water-tub that had been filled for emergencies.

Ready, on a previous occasion, had risked his life for Tommy. That young gentleman had, against orders, gone out in the boat, and his rescuer almost fell a victim to the sharks which swarmed round the island. It was Ready who now determined to go once more to the rescue. He could no longer bear to see the children and Mrs. Seagrave suffering so much for the want of water. He succeeded in his purpose, but was fatally wounded by one of the savages just as he regained the door of the stockade. The savage was shot, and the brave old seaman was dragged within the defensive walls.

The savages shortly after returned for a general assault. Suddenly the reports of the muskets fired by the defenders was drowned by a much louder report. Another and another followed, and the savages fell in great numbers. Round shot and grape came whizzing and tearing through them. They turned and

fled to their canoes. William, going to the look-out, discovered that his earlier surmise had been a true one. The shots came from a large schooner, which was sending a boat full of armed men ashore. William came down, opened the door of the stockade, and fell into the arms of Captain Osborn. Thus were the Seagraves saved.

It now appeared that the brig that came off the island some months before did see the signal made to her; but the weather was so rough that the captain made all speed to Sydney, and there reported what had taken place.

The boat in which the seamen of the Pacific had left that vessel, taking with them their unconscious captain, had been picked up and taken to Van Diemen's Land. Here Captain Osborn settled. When he heard the report brought by the brig, he induced the Government to lend him a vessel in which to seek his former shipmates.

Ready lived long enough to see Captain Osborn again, and to thank God for the preservation of those for whom he had worked so well. The closing scene is thus described:

"Ready opened his eyes. 'Are you there, William? I can't see you. Listen to me, my dear boy! Let me be buried under the trees on the mound above the well. I wish to lie there. Poor little Tommy! Don't let him know that he was the cause of my death. Bring him here now, and Juno and Caroline, to say good-bye, William.'"

The old man's last wishes were reverently attended to, the Seagraves prospered, and Tommy "grew up a very fine fellow and entered the Army."

PETER SIMPLE AND SOME OF HIS STORIES

Life at Sea in the Days of the Press Gang

THE period to which the story belongs is the early part of the last century, when Great Britain was at war with France. When Peter Simple was a boy he was regarded as the "fool of the family." His father, a clergyman of the Church of England, was a younger son of Viscount Privilege. Having no prospects of advancement, Peter went to sea.

In rising from the position of a midshipman to that of post-captain, Peter Simple rendered brilliant service to his country, and incidentally helped to give the foemen an impression that the English were a chivalrous people. On one occasion he was taken prisoner. He then met a General O'Brien, a French officer of Irish birth, who had a charming daughter, Celeste. After many daring adventures and hairbreadth escapes, one of the latter being from Bedlam Asylum, where he was confined by a wicked uncle, Peter succeeded to the peerage and the headship of his family, and married the beautiful Celeste.

Peter kept a journal. In this he recounted what befell him from early days, and his narrative is full of vivid pictures of life at sea, and of the different characters he met with while afloat. Some of these characters were chivalrous to a degree, notably his friend Terence O'Brien, a big-hearted Irishman. Terence and Peter had many stirring times together. Then there was the boatswain, Mr. Chucks, who aspired to be a gentleman, and, through the accident of wearing a captain's coat in a certain engagement in which he was wounded and left for dying, became a Swiss count. Another humorous character was the carpenter, Mr. Muddle, who believed that "in 27,672 years everything that was going on now would be going on again, with the same people."

The language used at the time of the story was often the reverse of polite; but these were the days of the Press Gang, when men were pressed into the Service whether they liked it or not, and when promotion in the ranks of the officers often depended upon personal influence at the Admiralty.

Peter Simple's first cruise was to the Bay of Biscay. He describes how the master's mate, O'Brien, took him in charge and cured him of sea-sickness.

"We ran through the Needles, with a fine N.E. breeze. I admired the scenery of the Isle of Wight, looked with admiration at Alum Bay, was astonished at the Needle rocks, and then felt so very ill that I went down below. What occurred for the next six days I cannot tell. I thought that I should die every moment, and lay for the whole of that time, incapable of eating, drinking, or walking about.

"O'Brien came to me on the seventh morning, and said that if I did not exert myself I never should get well, that he was very fond of me, and had taken me under his protection, and to prove his regard he would do for me what he would not take the trouble to do for any other youngster in the ship, which was to give me a good basting, which was a sovereign remedy for sea-sickness. He suited the action to the word, and drubbed me on the ribs without mercy, until I thought the breath was out of my body, and then he took out a rope's end and thrashed me until I obeyed his orders to go on deck immediately. Before he came to me I could never have believed it possible that I could have obeyed him; but somehow or another I did contrive to crawl up the ladder to the main-deck, where I sat down on the shot-racks and cried bitterly.

How Terence O'Brien cured Peter Simple of sea-sickness

"What would I have given to have been at home again! It was not my fault that I was the greatest fool in the family, yet how was I punished for it! If this was kindness from O'Brien, what had I to expect from those who were not partial to me? But, by degrees, I recovered myself, and certainly felt a great deal better, and that night I slept very soundly.

"The next morning O'Brien came to me again. 'It's a nasty slow fever, that sea-sickness, my Peter, and we must drive it out of you'; and then he began a repetition of yesterday's remedy until I was almost a jelly. Whether the fear of being thrashed drove away my sea-sickness, or whatever might be the real cause of it, I do not know, but this is certain, that I felt no more of it after the second beating, and the next morning when I awoke I was very hungry. I hastened to dress myself before O'Brien came to me, and did not see him until we met at breakfast. 'Peter,' said he, 'let me feel your pulse.' 'Oh, no,' replied I; 'indeed, I'm quite well.' 'Quite well! Can you eat biscuit and salt butter?' 'Yes, I can.' 'And a piece of fat pork?' 'Yes, that I can.' 'It's thanks to me, then, Peter,' replied he; 'so you'll have no more of my medicine until you fall sick again.' 'I hope not,' replied I, 'for it was not very pleasant.' 'Pleasant! You simple Simple, when did you ever hear of physic being pleasant, unless a man prescribe for himself? I suppose you'd be after lollipops for the yellow fever. Live and learn, boy, and thank Heaven that you've found somebody who loves you well enough to baste you when it's good for your health.'

Peter is thankful for his thrashing, but wants no more medicine

"I replied that I certainly hoped that, much as I felt obliged to him, I should not require any more proofs of his regard. 'Any more such striking proofs, you mean, Peter; but let me tell you that they were sincere proofs, for since you've been ill I've been eating your pork and drinking your grog, which latter can't be too plentiful in the Bay of Biscay. And now that I've cured you, you'll be tucking all that into your own little breadbasket, so that I'm no gainer, and I think that you may be convinced that you never had or will have two more disinterested thumpings in all your born days. However, you're very welcome, so say no more about it.'

"I held my tongue, and ate a very hearty breakfast. From that day I returned to my duty, and was put into the same watch with O'Brien, who spoke to the first lieutenant, and told him that he had taken me under his charge."

Among the many amusing stories told by Peter Simple is O'Brien's account of how Fingal, the Irish king, who preceded the great Brian Boru, "bothered the great Scotch giant."

How the Irish king Fingal bothered the great Scotch giant

"Fingal, you must know," said O'Brien, "was a giant himself, and no fool of one; anyone that affronted him was as sure of a bating as I am to keep the middle watch to-night. But there was a giant in Scotland as tall as the mainmast, more or less, as we say when we a'n't quite sure. Well, this Scotch giant heard of Fingal, and how he had beaten everybody, and he said: 'Who is this Fingal? I'll just walk over and see what he's made of.' So he walked across the Irish Channel, and landed within half a mile of Belfast, but whether he was out of his depth or not I can't tell, although I suspect that he was not dry-footed.

"When Fingal heard that this great chap was coming over he was in a

terrible fright, for they told him that the Scotchman was the taller by a few feet or so. Giants, you know, measure by feet, and don't bother themselves about the inches. So Fingal kept a sharp look-out for the Scotchman, and one fine morning there he was, sure enough, coming up the hill to Fingal's house. If Fingal was afraid before, he had more reason to be afraid when he saw the fellow, for he looked for all the world like the Monument upon a voyage of discovery. So Fingal ran into his house, and called to his wife Shaya. 'My vourneen,' says he, 'be quick now; there's that big bully of a Scotchman coming up the hill. Kiver me up with the blankets, and if he asks who is in bed, tell him it's the child.' So Fingal laid down on the bed, and his wife had just time to cover him up when in comes the Scotchman, and though he stooped low he broke his head against the portal.

"'Where's that baste Fingal?' says he, rubbing his forehead. 'Show him to me, that I may give him a bating.'

THE SCOTCH GIANT ARRIVES AT THE HOUSE OF FINGAL

"'Whist, whist!' cries Shaya, 'you'll wake the babby, and then him that you talk of bating will be the death of you if he comes in.'

"'Is that the babby?' cried the Scotchman with surprise, looking at the great carcase muffled up in the blankets.

"'Sure it is!' replied Shaya, 'and Fingal's babby, too; so don't you wake him, or Fingal will twist your neck in a minute.'

"'Then,' replied the giant, 'it's time for me to be off; for if that's his babby, I'll be but a mouthful to the fellow himself. Good-morning to ye.'

"So the Scotch giant ran out of the house, and never stopped to eat or drink until he got back to his own hills, foreby he was nearly drowned in having mistaken his passage across Channel in his great hurry. Then Fingal got up and laughed, as well he might, at his own cuteness."

Mr. Falcon, the first lieutenant on Peter Simple's first vessel, always punished good-humouredly, and, in some way or other, his punishments were suited to the offence. He always had a remedy for everything that he disapproved of, and the ship's company used to call him "Remedy Jack."

"I was much amused one morning," writes Peter Simple. "We were stowing the hammocks in the quarter-deck nettings when one of the boys came up with his hammock on his shoulder, and as he passed the first lieutenant the latter perceived that he had a quid of tobacco in his cheek.

"REMEDY JACK'S" WAY OF DEALING WITH A VERY OLD COMPLAINT

"'What have you got there, my good lad—a gum-boil? Your cheek is very much swelled.'

"'No, sir,' replied the boy, 'there's nothing at all the matter.'

"'Oh, there must be; it is a bad tooth, then? Open your mouth and let me see.'

"Very reluctantly the boy opened his mouth and discovered a large roll of tobacco-leaf.

"'I see, I see,' said the first lieutenant, 'your mouth wants overhauling, and your teeth cleaning. I wish we had a dentist on board; but, as we have not, I will operate as well as I can. Send the armourer up here with his tongs.'

"When the armourer made his appearance the boy was made to open his mouth, while the chaw of tobacco was extricated with this rough instrument.

"'There now,' said the first lieutenant, 'I am sure that you must feel better already; you never could have had any appetite. Now, captain of the after-guard, come forward, bring a piece of old canvas and some sand here, and clean his teeth nicely.'

HOW THE CABIN-BOY'S TEETH WERE SCRUBBED WITH SAND AND CANVAS

"The captain of the after-guard came forward, and putting the boy's head between his knees, scrubbed his teeth well with the sand and canvas for two or three minutes.

"'There, that will do,' said the first lieutenant. 'Now, my little fellow, your mouth is nice and clean, and you'll enjoy your breakfast. It was impossible for you to have eaten anything with your mouth in such a nasty state. When it's dirty again come to me, and I'll be your dentist.'"

Which you will admit was a very good way of curing the boy of a nasty habit that used to be common among sailors, and has not yet quite disappeared.

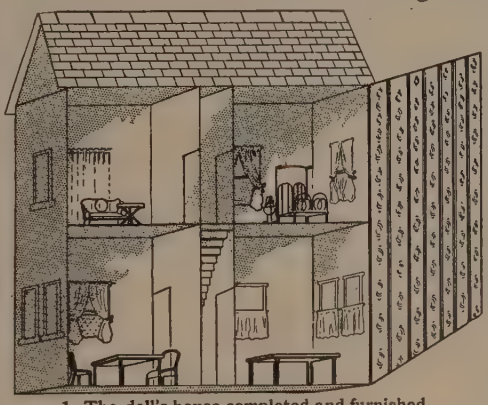
The next story of Famous Books is on 2159.

MAKING A DOLL'S HOUSE

CONTINUED FROM 1928

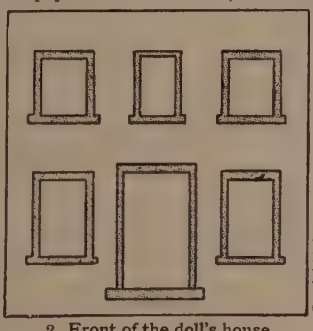
Most boys have sisters, and if they have not they are pretty sure to have girl cousins who would be glad to have a doll's house. And a doll's house is by no means a difficult or an expensive thing to make.

The first thing we want is a box from which to make our doll's house, and we may be successful in finding the nearest grocer willing to let us have an empty box that would suit. Some boxes, such as grocers have, are very suitable indeed. A semolina-box, for instance, is just about the right size, the wood is nice and thin, so that it is not difficult to work, and one side of it hinges with a wire hinge, which will enable one side of our doll's house to open and close so that its proud owner may arrange the furniture in the rooms we are about to make. We can explain what we want to the grocer, and he will give us the nearest box he can to suit our purpose. Picture 1 shows the house we are about to make when it has been finished and furnished.



1. The doll's house completed and furnished

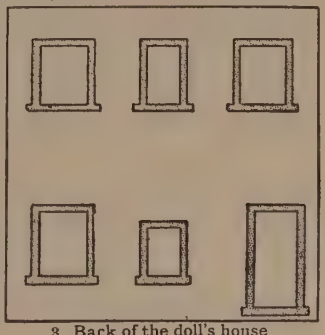
We shall suppose that we have got two empty semolina-boxes, and shall see how we can adapt them to make a good doll's house. One of the boxes will serve as the frame of the house, and the other we shall cut up to make partitions and floors. Upon the bottom of one box, outside, we make a drawing something like picture 2, which shows a hall door in the centre of the ground floor of our house, with a large window at each side, and up near the top we have three windows which will be on the upper floor when the house is finished. We can cut out the windows and the door, leaving the window-sills and door-posts drawn upon the wood.



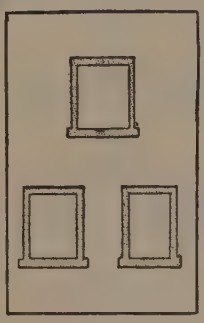
2. Front of the doll's house

Upon the back of the house, which is the lid of the box upon which we are working, we make the drawing of picture 3, but in this case we had better not cut out the windows and door, because this would weaken the back wall too much, and we wish to keep it strong so that it may open and close without breaking. But on each side of the house we make a drawing like picture 4, and in this case we cut out the windows, as we did in making the front wall.

We now attend to the inside of the house, and for the partitions and floors we cut up the second box that we were lucky enough to get. If the second box is the same size as the first box, we take out one end carefully and it will do for a floor which we put across rather more than half-way up the height of our house. We shall thus give the ground floor rooms roofs a



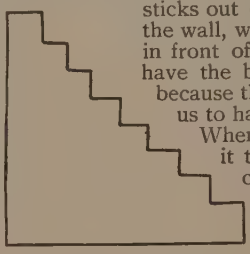
3. Back of the doll's house



4. The side of the house

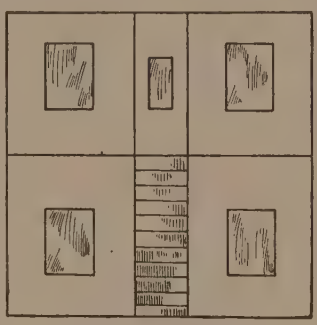
little higher than the upstairs rooms. We had better not nail the floor into position yet, because, before we do so, we must cut a hole for the stairway, and we are not ready for that yet. But with books or something else we can prop up the floor temporarily, taking care that we have it level.

Now measure the distance from front to back in the ground floor, and the height from the floor to the roof. Make two partitions to go in, as shown in picture 5, and make two similar partitions for the upper floor. It will be seen that the lobby goes right from the front door to the back of the house. The upstairs lobby has a window at each end. The doors should be cut in the partitions as shown, but in one partition we make two doors—one at each end of the partition. We shall see why, presently. When all these pieces are ready, but not nailed into their places, we can make the stair to lead from the ground floor to the upper floor. About the best thing to use for the stair is an empty cigar-box, if we can get one. Tobacconists have usually plenty, and we should be able to get one without difficulty.



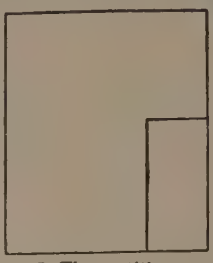
6. The side of the stair

We cut the lid of the cigar-box to the shape seen in picture 6, making the total height the same as the height of the ground floor, so that the top of the stair will be on the level of the upper floor. Then we cut the bottom of the cigar-box exactly in the same way, and that gives us two sides for our stair. We glue one of these pieces to one partition and the other piece to another partition, seeing that the front of the stair is clear of the doors of the two partitions. Now we cut short pieces from the remaining wood of the cigar-box to make steps to go right across the lobby—making front pieces, or *risers*, as they are called, as well as top pieces, or *treads*. The part of the lobby under the stair will make a nice scullery or closet, which has a door leading from the kitchen. We now see why one partition had two doors; one of the doors leads from the lobby into the kitchen and the other from the kitchen into the scullery. We now cut a hole of suitable size in the upstairs floor to take the top of the stair. We are now ready to nail the floor into position, and we do so by driving thin wire nails through the side walls and front of the house, being very careful to get them straight into the floor. Similarly we nail the partitions into place. The position of the partitions and stair will then be as seen in picture 7.



7. Partitions and stair in place

8. The roof of the house



5. The partition

We shall provide our doll's house with a sloping roof, and, taking our sizes from the present flat roof, we make and erect upon the latter a sloping roof, as shown in picture 8. It consists of two large sloping sides and two end pieces of triangular shape. The sloping side that goes down over the front wall may be made so that it sticks out quite a little beyond the front of the wall, which will give us eaves projecting in front of the house. We must, however, have the back roof shorter than the front, because the hinged back wall will not allow us to have eaves at the back of the house. When we have made this roof we nail it to the flat roof of the house, being careful that the back edge does not prevent the back wall of the house from hinging open.

The structure of the house is completed, but we have still something to do in the way of interior decoration. We can paper the walls of the different rooms with wallpaper. We can use ordinary wallpaper with a very small pattern, or plain tinted paper; but the best sort of wallpaper for a doll's house is the sort of fancy paper the bookbinders sometimes use for the inside covers and fly-leaves of books. This paper is sold by many stationers.

We can fit small panes of glass into the window-spaces that we cut out, and we can even drape the windows with curtains. If we put in glass windows we shall require eleven pieces of glass, which should be a little longer and a little wider than the eleven window-spaces that we have cut out. The simplest way to fix them will be to put in two sharp tacks just below each window so that the glass may rest upon them, and other two tacks at top to keep the glass from falling into the rooms. The doors of the various rooms can be provided with hinges by using cloth or thin leather, glued into place.

A chimney can be made for the roof, and the outside can be painted, say, slate colour for the roof, and red with black lines on the walls to imitate bricks. Then the house is ready to be furnished with the furniture which we have seen how to make in another part of this book.

WHAT TO DO WITH A BOX OF BEADS

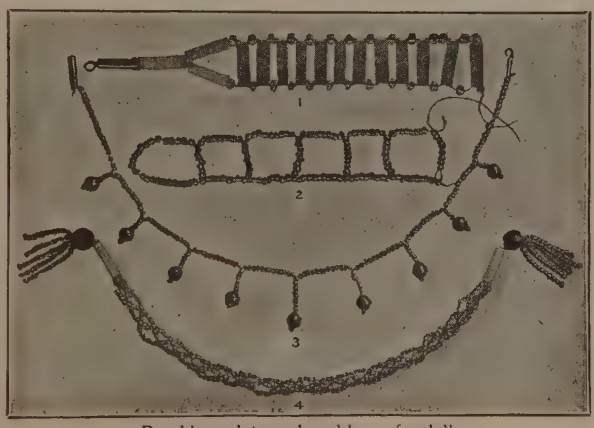
We all know how to thread beads, and many little girls can make a ring of beads for their finger; but here we are going to see how to make something more interesting than plain chains and rings.

We shall want two little bundles (or "hanks," as they are called) of glass beads, one pink and one blue, and a few bugle beads, the long, round ones like little tubes.

The "hanks" cost about two or three cents. each, and contain twelve rows of beads.

In picture 4 we see a plaited necklace with tasselled ends, just fit for a big doll. To make this necklace, separate three rows of beads from the hank, and, without letting any slide off the thread, carefully knot the threads together at one end; then plait the three rows of beads—in the same way as we should plait our hair. Then knot the other ends of the thread close up to the finish of the plait.

Now, with a needle and thread we begin the tassels. We shall notice that a bugle comes next to the plait. To fix this on, we must tie the end of a thread (attached to the needle) to the end of the plait with a small knot, and then thread on the bugle in the usual way. Next thread on a big round bead of some pretty colour (a pearl bead will look well if we can find one), and then take *one* of the glass beads from the hank and thread that on. Hold it close up to the big bead and put the needle through it *again*, drawing the thread tightly round the bead. This bead will now be firmly fixed; it keeps the big bead and the bugle in position while we make the tassel.



Bead bracelets and necklaces for dolls

Still with the same thread take up twelve glass beads, push them up close to the fixed bead, and "fix" the last one—the twelfth bead—in the same way by passing the thread through again and drawing it tightly. Now we have to pass our needle through the eleven beads again, bringing it out at the other end. Each piece of the tassel is made in this way. So you see there are *two* threads in each piece and a fixed bead at the end. Make five pieces and our tassel is complete. When we have made a tassel at the other end of the plait, the necklace will be finished.

Now let us look at picture 3. This is a plain chain necklace with little "bobs," or pendants, hanging from it all the way round.

We begin by attaching one end of an ordinary fastener, or catch, to our thread. If we cannot find one of these from an old necklace, a piece of baby ribbon from a chocolate-box will make quite a pretty fastening.

Thread on about twenty pink beads, then one blue one, then four pink ones, one pearl (a good deal bigger to form the bob), and then one blue one again. This last blue one has to be *fixed* in the way we have already learned.

When the last blue bead is fixed, return the needle *through* the pearl bead and also through the four pink glass ones; then thread on one more blue bead and ten more pink ones. We shall see now that we have made a piece of the chain with one little pendant hanging from it.

After the ten pink beads we must thread one more blue one, and make another pendant in the same way, then ten more pink beads, and so on, to the end of the necklace.

We can, of course, make it as long as we like—but we must decide how long it is to be before we start, because it is very tiresome to find that we have not enough thread on the needle. It makes the necklace look nicer if we add one more pink bead to the pendant each time, until we get to the middle; then we must leave one off each time in order to make the other side match.

If we look carefully at the picture we shall see why this has been done—it makes the centre "bob" the longest, and gives a better appearance to the necklace.

Picture 1 shows a ladder bracelet made of bugles and blue beads. For these ladders we must work with *two* threads instead of one.

We take about a yard for each needleful, and tie the ends of the two threads together with a good big knot. Now we thread on one bugle and pass both needles and cottons through it; then we put on two bugles, one on each cotton; then a blue bead on each cotton—that makes the start. The next bugle that comes is the first step on the ladder and goes "across."

To get this we have to put both needles through the bugle, one in at one end and one in at the other, so making the threads cross to the other side of the ladder. Next put on two blue beads, one each side, and then another crossway bugle in the same way as the last. We continue this until our chain is long enough for a bracelet, when we finish it off with three beads in the same position as the three we started with.

It will make it easier to manage if we fix the end, after we have made a start, to the

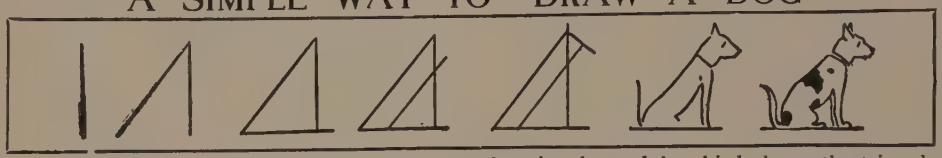
table-cover or a pincushion. To do this we must put a safety pin through the knot at the beginning.

Picture 2 shows a ladder chain made of small beads only. It is made in just the same way as the bugle ladder, with two threads.

We start with twelve beads on each thread, and then put eight across, then eight each side, and eight more across. If we find that it is a little difficult to prevent it from slipping out of place when we first begin, "fix" the last side bead of each eight before threading on the eight across. But we ought not to find this at all hard to manage.

Now that we have learned how to make these necklaces and bracelets, we shall probably be able to invent quite a number of new ways of threading beads for ourselves.

A SIMPLE WAY TO DRAW A DOG



If you want to draw a dog, and you are not clever at drawing, this shows you how to make a splendid little dog by the aid of three straight lines drawn faintly in pencil in the form of a triangle. The first picture shows an upright line, the second shows two sides of the triangle, and the third shows the triangle complete. The next two pictures provide the guide lines for the under side of the dog's body and the lines for his head. When you have filled in the outline, the pencil lines, of course, should be rubbed out.

HOW DID THE KING'S JESTER ESCAPE FROM PRISON?

Long ago, when every king had his jester to make jokes and amuse him and his courtiers by saying funny things at table, one king got it into his head that his jester was a wizard. That was the time when people suspected of being wizards or witches were put to death; and the king cast the jester into prison.

While there in his dungeon high up in the castle, the jester's nimble wits tried to find a way of escape for him. The difficulty was that the window of the prison was so high above the moat that, even if the lower iron bar were removed from the window, and the jester could manage to squeeze his body through it, the distance was too great to jump, and the walls gave no foothold. So that this way of escape seemed to be quite impossible.

In peering all around the prison where he was, the jester, to his delight, found a piece of thick rope hidden away in the darkest corner. A rope was just what he wanted. But, alas! it was far too short to reach the ground.

What was he to do? In his "Canterbury Puzzles" Mr. Dudeney tells how the jester managed to reach the ground with the short piece of rope.

He remembered hearing the story of the Irishman who had a blanket that was too short for him, and lengthened it by cutting a yard off the bottom and joining it on to the opposite end. That was just an Irish tale, but it gave an idea to the jester; for he divided the rope into two halves and fastened the two parts together again, and so he was able to let himself down from the window by the rope.

But how did the jester manage to make the rope long enough to reach down to the ground?

HOW TO TELL THE WEATHER

It is always useful to be able to tell the weather, that is, to judge by the condition of the sky and the atmosphere, and so on, what the weather is likely to be in the next twenty-four hours. Of course, a great deal depends upon the locality, for conditions that mean coming wind in one place may mean rain in another. But there are general principles that are worth remembering, and will help us in our study of the weather.

If at sunset the sky appears red, fine weather may be looked for on the coming day; but if the sky is red in the morning there will probably be wind or rain. A yellow sky in the evening generally means a wet day to follow, and if the sun sets in a dense bank of clouds, rain may also be looked for. If the morning is hazy, and the sun is seen through a mist but the sky appears blue, the day will most likely be warm.

If the early morning is cloudy, but as the time goes on the clouds begin to disperse, a fine day is to be anticipated. When the stars seem particularly bright at night, and twinkle more plainly than usual, a wet day usually follows. We may often get a good idea of the weather that is likely to be experienced by watching animals. Cats often rub themselves behind the ears a great deal when bad weather is coming, and before rain cats are restless and lie with their backs to the fire.

These are only some of the ways in which we may get an idea of what the weather is likely to be, but there are many other indications, which may be learnt by observation, and the studying of the local conditions and the watching of results provide excellent training for the mind, and practice for the eye.

MODELTOWN HOTEL AND RESTAURANT

MODELTOWN is now growing to be a place of some size and importance. We have built a large railway station, but we have not yet provided any hotel where the people who come to the town may stay. So we will now build a hotel with a restaurant attached. As we expect Modeltown to grow still further, the hotel will be a good large one. A general view of it is shown in picture 1. From this side it looks like one large house with a smaller one attached to the side of it. The hotel itself consists of an outer square shell which forms the outside wall, and an inner square shell which forms the interior wall and encloses a well right in the middle of the block. The reason for making the well is that the rooms that have no windows in any of the outer walls may be lighted from the back. The ground floor is made so as to form with the restaurant at the side a winter garden, containing a bandstand, from which the guests at the hotel can be entertained with music as they sit at the tables. After examining carefully the finished appearance of the work we are about to do, as seen in picture 1, we will proceed to make it.

1. The design for the hotel and restaurant for Modeltown

The first thing we require is a large piece of cardboard or strawboard, and upon this we shall build the hotel. The card should be about 10 inches square.

The first plan drawing is in picture 2, and is half-scale, so that we use scale-rule B to take the sizes from the picture and make the lines on the card with our full-sized scale-rule. We remember, of course, how to treat the three kinds of lines shown in the plan drawings and as explained on page 446. We must also observe that the three lines in picture 2 which have a small circle at each end should be half-cut, not on the side of the card where the drawing is made, but on the back of the card at the places marked. Having made the drawing and cut out the card, we bend it around as seen in picture 3. It will be seen that we bend it so as to make the windows inside and not outside. The reason is that this part is the piece that makes the inner walls of the hotel, and that these windows look out upon the well formed by the walls when they are bent around The four large parts at the top of each side fall outwards, and the side opposite the arched doorway has a part that folds upwards as seen in picture 3. We now glue the piece on to the cardboard which is to serve as a foundation. It should be placed in the middle of the card, and in gluing it down we should see that the four sides are made to form a square exactly. This may be tested by measuring the distance between the two pairs of opposite corners. These two distances should be exactly the same.

Now we draw the plan given in picture 4, which is one-third scale, so that we use scale-rule C to take the sizes from the picture, and make the lines on the card with the full-sized rule. We cut this piece out after it has been drawn, remembering to half-cut the lines having the tiny circles, not on the drawing side of the card, but on the opposite side. This piece folds up and forms the outer walls of the main part of the hotel. Having cut it out, we put it aside in the meantime.

We will now make the plan drawing given in picture 5. It is actual size in the picture, so that we use the full-sized scale-rule both for taking the sizes from the picture and for making the drawing on the card. We must notice that the lines with the small circles at the ends should be half-cut and folded on the back of the card and not on the drawing side of it.

Picture 6 is half-scale, and we will require two of it. Therefore we make two drawings upon our card, using scale-rule B to take the sizes from the picture, and cut them out, noticing that two of the lines on each have to be half-cut and bent on the back of the card. We then bend up and glue together the piece made from picture 5, and the two pieces made from picture 6. These represent a glass-paned roof for inside the well made by the interior walls, and when glued together will look like picture 7. When glued into position between the walls, the roof will be as seen in picture 8. If we have fixed the inner walls on to the foundation card correctly—that is to say, exactly on the square—the glass roof ought to fit the place exactly.

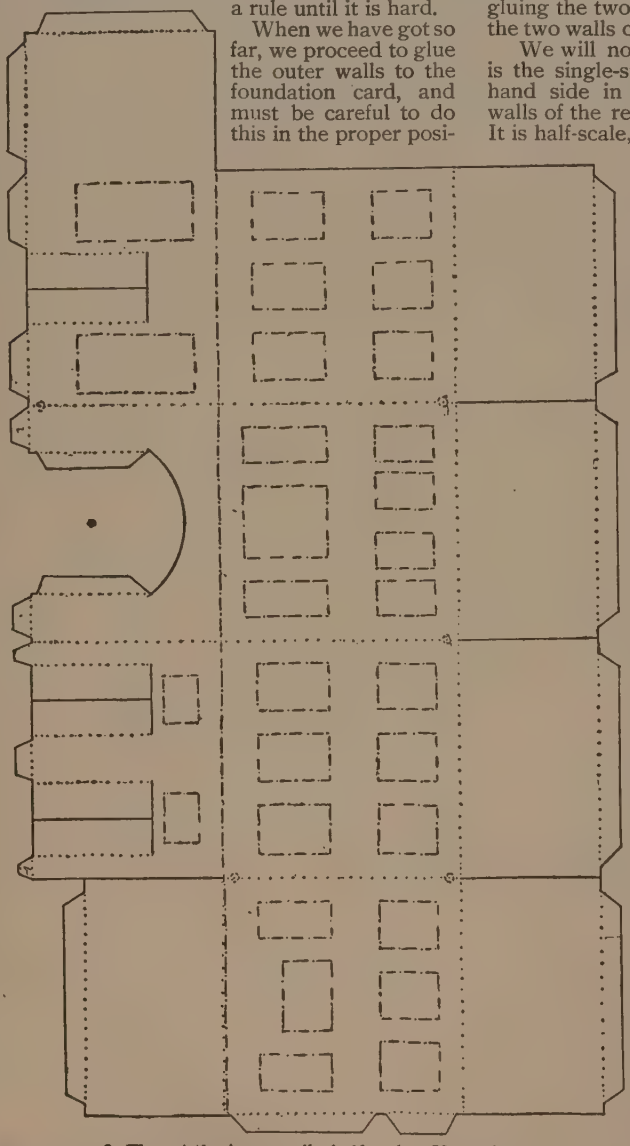
The plan in picture 9 is half-scale, so in making it we use scale-rule B. After cutting it out, we attach it to the arched doorway, as shown in picture 10, the slips on the

doorway in picture 2 being glued to the sides of the hallway made from picture 9, and the bottom slips of the latter being glued to the foundation board.

Now we turn to the drawing which we made from picture 4, and which we put aside after having cut it out. We bend it up so that it will look like picture 11. The reverse half-cuts in the upper parts of the sides are bent over to make a heavy cornice, something like the edge we made to the platform of the railway station. Picture 12 shows the bends of the cornice more plainly than picture 11. In making it a little thin glue should be put inside the extreme front edge, which should be pressed flat with the help of a rule until it is hard.

When we have got so far, we proceed to glue the outer walls to the foundation card, and must be careful to do this in the proper position. This position is not difficult to find. In picture 10 we see the arched hallway which we glued to the inside wall. The arched doorway in the outer wall is fixed at the other end of this arched hallway, the slips at the side of the arched doorway being glued to the sides of the hallway. Also we see at the right-hand side of picture 8 that there is a flap sticking out horizontally. This flap is glued to the inner side of the outer wall. In picture 13 is seen a flap folding inside the outer wall. The folded edge of this flap must be glued to the inner wall opposite it. By getting the arched doorway into the proper position, by seeing that the four outside corners of the house are square, and by gluing the two connecting flaps into position, the two walls cannot fail to be correctly fixed.

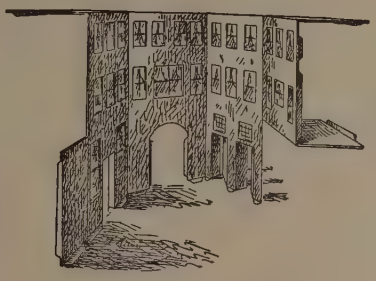
We will now make the restaurant, which is the single-storey part shown on the left-hand side in picture 1. The plan of the walls of the restaurant is given in picture 22. It is half-scale, so that we use scale-rule B to take the sizes from the picture and the full-sized rule to make the drawing upon the card. Observe the lines that must be half-cut and bent in the opposite direction from usual. When being bent around, this piece will look as shown in picture 14.



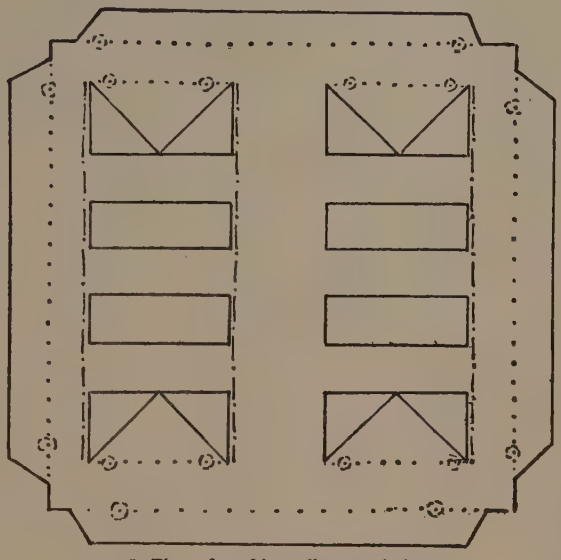
2. Plan of the inner wall: half-scale. Use rule B

But before gluing the restaurant walls to the hotel, we must make the bandstand for the interior of the restaurant. We make drawings of pictures 24 and 16, making both full size. In picture 22 is a half-circle showing where the top of the bandstand fits, and we glue up the drawing made from picture 24 so as to fit this place. Picture 16 is the plan of the stairway, and we have already made it. We now glue it to the floor, and the bandstand is seen as in picture 17, which also shows a few pillars supporting the bandstand at its front edge. These pillars we can make from wooden matches, and fit in if we care to, but it will do all right without these. Two sides of the restaurant have a cornice something similar to that on the hotel. This cornice is bent up as already explained and as shown in picture 12.

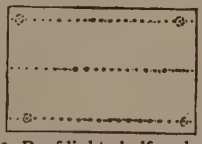
We will now attach the restaurant walls to the hotel. The gluing slip at one end is glued to the side of the hotel as seen in picture 1, the side with the two large doors is in line with the front of the hotel, the side with the two doors and a window form the back of the restaurant, and



3. Folding the inner walls



5. Plan of roof in well: actual size

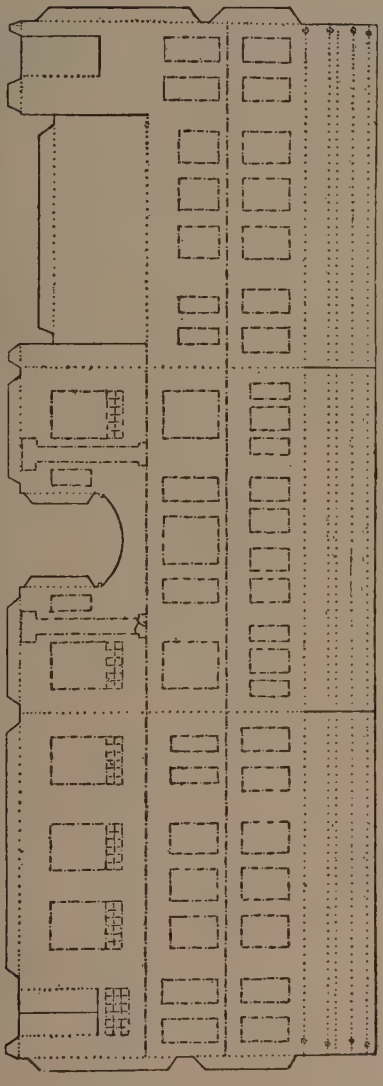


6. Roof-light: half-scale. Use rule B

7. Glass roof in well

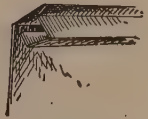
9. Arched hall: half-scale. Use rule B

8. Glass roof in position

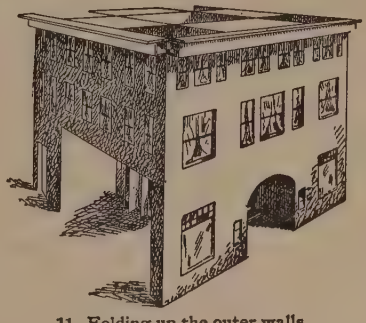


4. Plan of outer walls: one-third scale. Use rule C

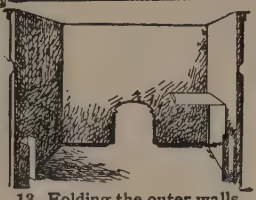
10. Hall-way fixed



12. Fold for the cornice

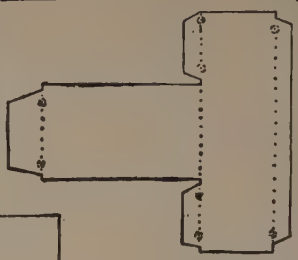


11. Folding up the outer walls

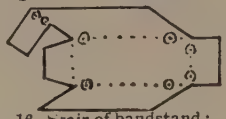


13. Folding the outer walls

14. Folding the restaurant walls

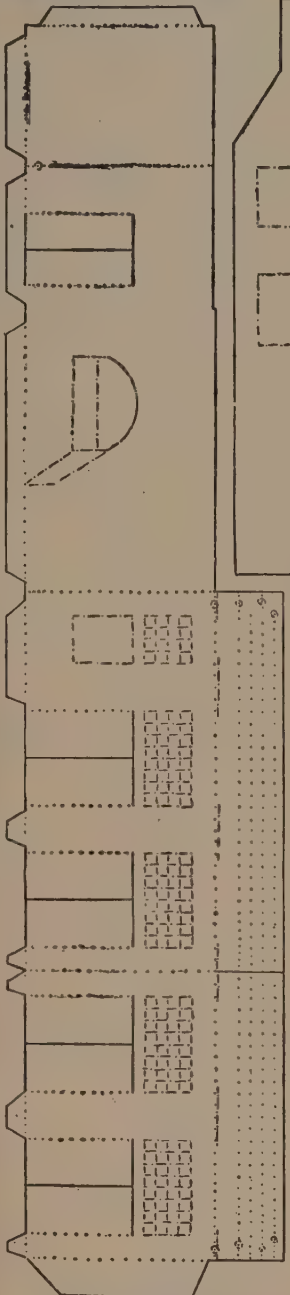


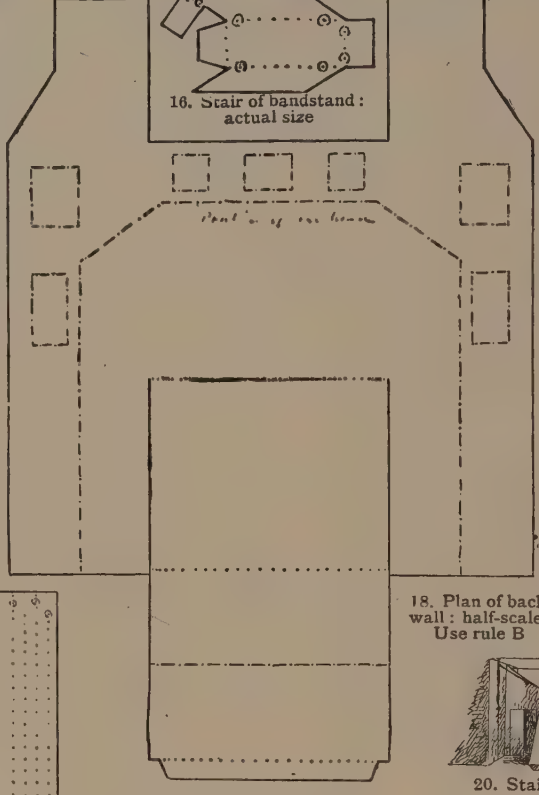
15. Staircase : half-scale. Use rule B



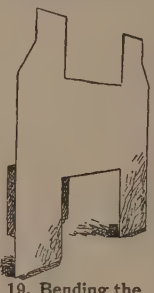
16. Stair of bandstand : actual size

17. Bandstand in position



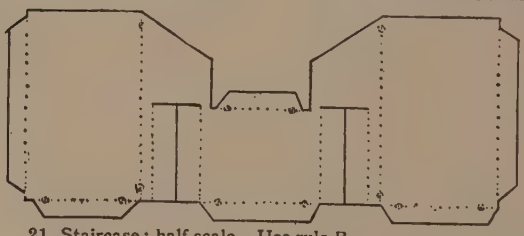


18. Plan of back wall : half-scale. Use rule B



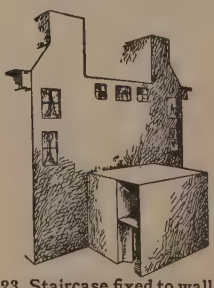
19. Bending the back wall

20. Staircase from inside

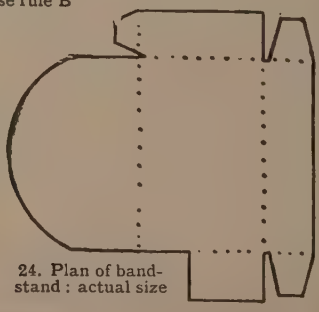


21. Staircase : half-scale. Use rule B

22. Plan of restaurant walls : half-scale. Use rule B



23. Staircase fixed to wall



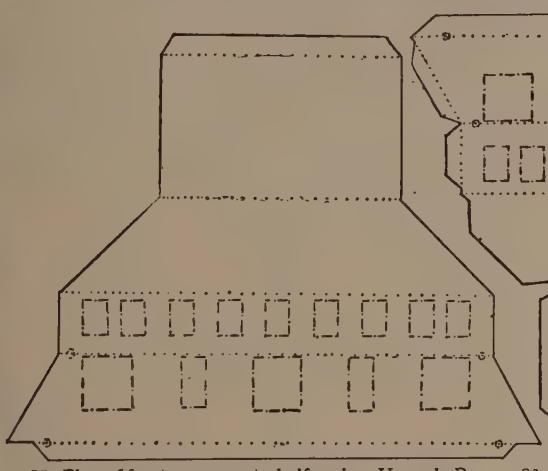
24. Plan of bandstand : actual size

extends as far as the inner wall of the hotel. The fourth side turns to the right at a right angle, and is glued to the fourth side of the hotel. The gluing slips that touch the floor must be bent inwards and glued to the foundation card, and care must be taken to keep the two corners of the restaurant square.

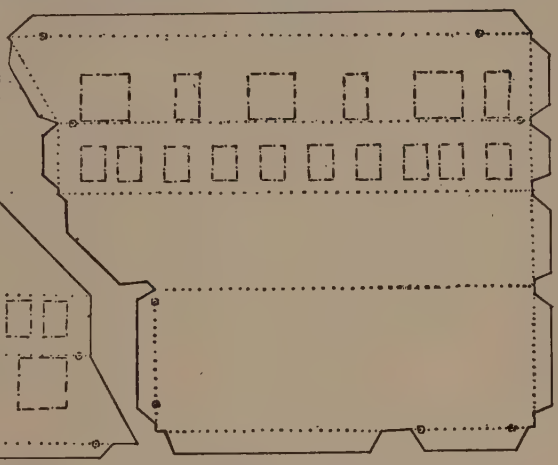
The next part of our hotel which we will undertake is the fourth wall of the hotel proper—really the back wall. This part is simple. It consists only of a wall with the middle of the lower part thrust back. Its plan is given half-scale in picture 18, so we use scale-rule B to take the sizes from the picture, and make the drawing on the card with the full-sized rule. We cut this part out and bend it into the shape shown in picture 19, but do not yet glue it into position. The staircase is to be built against this part. The plan of the staircase is given in two parts—in pictures 21 and 15. Both are half-scale, so that in making them we use scale-rule B for taking our measurements from the pictures. Picture 15 is the plan of the stairway itself, and picture 21 of the surrounding partition with two swinging doors leading into the hotel. We make drawings of both 21 and 15 upon our card, and cut them out, observing carefully the lines that must be half-cut and bent on the opposite side from the drawing.

Then we bend the pieces and glue them together in the position shown in picture 20. We now fix these pieces to the back wall which we have made. The folding middle portion of the back wall goes over the staircase, so that from outside all three parts, when glued together, will look like picture 23. Having done all this, we put this piece aside until we have progressed further with the main building.

A glance at picture 1 will show that there are two storeys of the hotel above the ornamental cornice which we have already made. We will make these pieces next. Picture 25 is the plan of the portion above the hotel main door. It is half-scale, so we must use scale-rule B in taking the sizes from the plans. Notice that two of the lines must be half-cut and bent on the reverse side. As we bend it up we must remember that its lower portion is a sloping roof with dormer windows, and that the upper row of windows are plain with the wall around them upright. The part with sloping sides above the windows is the roof, and the top portion of it bends back and forms the inner wall of the front. Care is required to get everything exactly right, but it is not very difficult. Next we make the two top storeys of the hotel on the left side—that is to say, on the side above the restaurant. Picture 26 gives the plan of this part. It is half-scale, so again we use scale-rule B in taking the measurements. We must observe the reverse half-cuts and bend here also. This piece is bent up and fixed into position in the same way that we did the top storeys of the front. Now we want the top storeys on the side opposite the restaurant, the side that is not seen in picture 1.



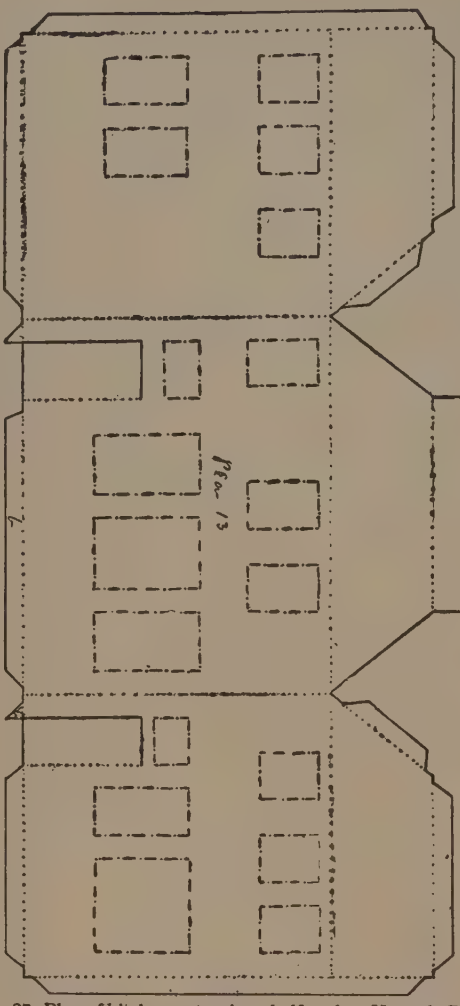
25. Plan of front upper part: half-scale. Use rule B.



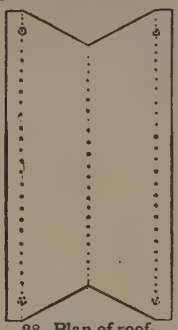
26. Plan of side upper part: half-scale. Use rule B

We make another drawing of picture 26, again using scale-rule B, but this time we make a right-hand drawing instead of a left-hand drawing. This means that we must reverse the drawing we have already made. The best way to do this is to make it on the card just as we did before, and then pierce the card with a fine pin or a needle at the corner of every window. Then we make another drawing on the back of the card, following the pinholes. We glue this piece into position, and we have then completed the two top storeys all round. We must be careful as we fix them on that the corners of the different pieces fit each other neatly, as they ought to do, otherwise the finished hotel will look ugly.

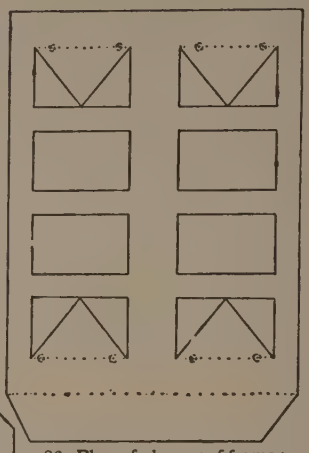
We are now ready to glue into position the fourth outer wall, which we have already made, and to which we attached the staircase and swinging doors. It is seen on picture 23 glued to the back of the hotel, which it will fit exactly. The gluing slips must be bent over to right angles, and the



27. Plan of kitchen extension: half-scale. Use rule B



28. Plan of roof-light: half-scale. Use rule B

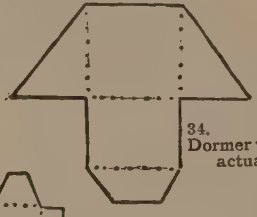


29. Plan of glass roof frame: half-scale. Use rule B

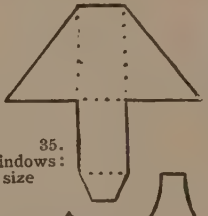
30. Hotel with kitchen

31. Chimney: half-scale. Use rule B

32. Restaurant roof



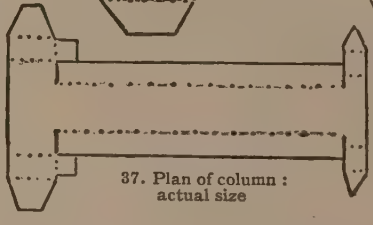
34. 35. Dormer windows: actual size



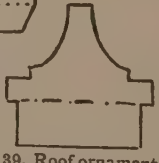
36. Folding dormer window

38. Folding column

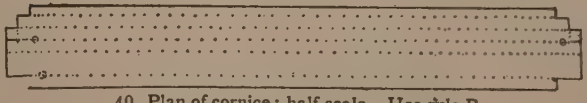
33. Chimneys in position



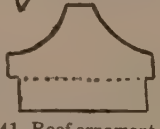
37. Plan of column: actual size



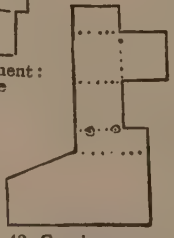
39. Roof ornament: actual size



40. Plan of cornice: half-scale. Use rule B



41. Roof ornament: actual size



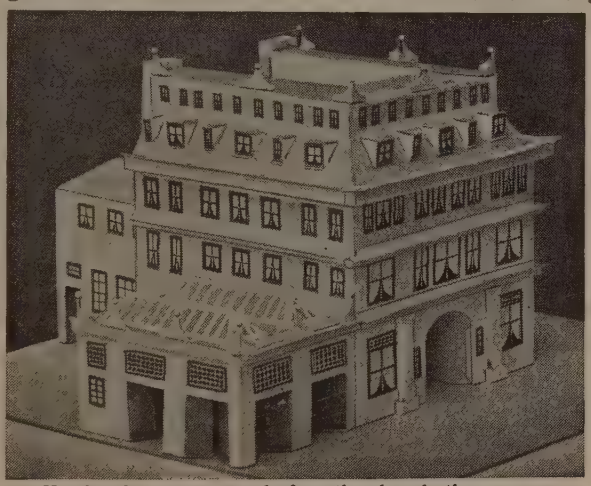
42. Cornice corner: actual size

glue should be rather thick that it may hold firmly and set quickly. We glue the bottom slip of the stair to the foundation board.

We have yet another important part of the hotel to make, namely, the part to contain the kitchen and store-rooms. This portion is seen finished in picture 30. It is really another building attached to the back wall of the hotel. The plan of this part is given half-scale in picture 27, which means that we must use scale-rule B to take the sizes from the picture, and make the drawing on the card with the full-sized rule. The piece consists of a front with a door and several windows, two side walls, one of which has a door, and both of which have several windows. The roof when bent into shape has a flat top and three sloping sides. When we have glued the roof into place we may glue the whole of the kitchen part on to the back wall of the hotel, which we shall find that it fits. Picture 30 shows us the hotel at this stage. We notice that the restaurant has no roof, so we will now proceed to make one.

Picture 29 is the plan of the frame of the restaurant roof. It is half-scale, so we use scale-rule B to take the measurements. We must notice also that some of the lines—those with the small circles at each end—must be half-cut and bent on the side of the card opposite from the drawing. Then we make two drawings of the plan given in picture 28, which is also half-scale, so that again we use scale-rule B to take the measurements. We have here also some lines that must be half-cut and bent on the opposite side from the drawing. We already made a glass roof for the interior wall of the hotel, and we glue the three parts to make this one in the same way. Picture 32 shows the roof when completed, the view being from below. It is not intended to glue the roof into position on the top of the restaurant. It will be better to have it lift or slide off, and the end slip seen in picture 32 will serve as a handle. Some matches should be glued to the wall inside, so that the roof may rest upon them.

Picture 31 is the plan of the chimneys, of which we require two. The plan is actual size. But one of the chimneys is made the reverse of the other, as one is for the left-hand side and one for the right-hand side. We therefore make two drawings, one of which we half-cut and bend from the back.



Hotel and restaurant made from the plans in these pages

The position of the two chimneys is seen in picture 33. It will be noticed that they project a little higher than the roof of the hotel. On the sloping part of the walls above the cornice are some dormer windows—some of them being wide and some narrow. We require nine wide windows, so we make and cut out the drawing in picture 34 nine times, and we require eight narrow windows, so we want the drawing in picture 35 eight times. Both of these are actual size. Having made these, we glue them into their places as indicated by the dotted lines in pictures 25 and 26. Picture 36 shows a dormer window being folded in shape.

Picture 37 is the plan of the two square columns seen in picture 1 at the sides of the main entrance. The picture is actual size, and a column being folded is seen in picture 38. We make two columns and fit them into position. There are two cornices still to be made, one going right round the two sides of the hotel between the ground floor and the first floor, and the other going round three sides of the hotel between the first floor and the second floor. Picture 40 is the plan of the upper of these two cornices for the front of the hotel. It is drawn, cut out, and folded as already explained, and as seen in picture 12. We make the remaining cornices in the same way, taking our sizes from the building itself. Picture 40 is the actual-sized plan for the roof decorations for the restaurant, the chain line showing where they are glued to the inside of the walls. We make five of these, or, indeed, more if we like, and fix them on as seen in picture 1. We cut one of them in halves where it goes against the wall of the hotel. Into or behind the top of these decorations we put pearl-headed toilet pins, and the result is very effective. Picture 41 is the actual size of one of the decorations for the main roof of the hotel. We make seven or more of these and glue them to the edge of the roof as seen in picture 1, also mounting them with pearl-headed pins. We have now to make only two corners for the large cornice. The plan is given in picture 42. One is bent over in the opposite way from the other, and they will be found to fit the corners of the large or upper cornice.

The hotel is complete except for the finishing. We had better have the walls white, making the woodwork red, and the windows and roof-lights blue, and the roof also blue.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF NOVEMBER

On another page we promised to give a list of some of the best plants to grow in our rock gardens. Here we shall find them; but we must understand that if the weather is sharp and frosty or wet, and the soil too full of moisture to work, the actual planting must be put off until the spring.

If you have not space to make a little rock garden it is possible to make a bit of rockery edging, and that, too, will give great pleasure. You could do this at any time when the weather is open and fine, and leave the planting until the spring; and you will use rock or clinker to form it, as you would in making the more important piece of rock garden.

And now for our list of plants. You will remember that we recommended, in May or June, to rear some of these from seed to be in readiness for the rock garden you were thinking of making; but if you failed to rear seed you can buy a plant or two of each kind quite cheaply, and, as they soon grow into large masses in many cases, you will not need to plant closely. Give plenty of room, and, above all things, do not be disappointed the first season if the plants are small and the masses of flowers only tiny patches. Wait—wait—wait. It is wonderful what one year's growth will do. These little patches will grow into large clumps and masses.

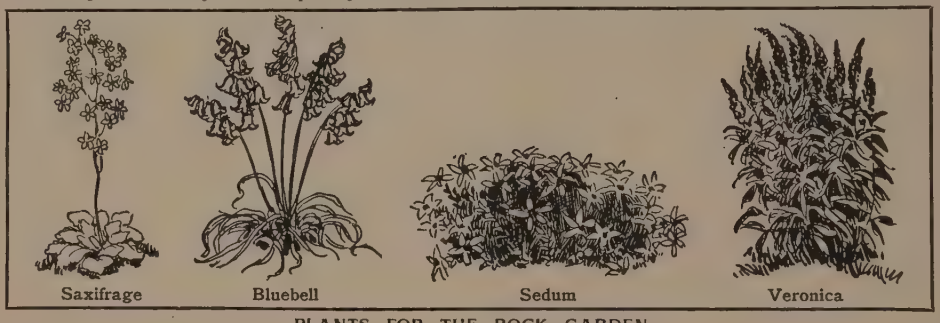
The saxifrages are capital rock-garden plants. There are several kinds; some known as the mossy varieties have a charming appearance, while among the rosette kind you will be able to include that good old favourite London Pride. We need not go into the question of the many different kinds; it will be enough just to get as many as we can, and when we can, and where we can. Of the sedums, too, we could, if we wished, make quite a long list of the many different kinds, but again there is no need. It is well to know they succeed in hot, dry positions.

The beautiful pink family, that we ought more properly to call the Dianthus family, will give us some delightful plants, and they, too, and also the rock roses, may have warm and sunny positions given to them.

Of course, we may need plants for cooler spots quite as much as these sun-lovers, and for such positions we may have many bell flowers, or campanulas. Some of these are quite small and dwarf, others, again, are giants in comparison. We can have some of both kinds, and give them positions in which the soil is rather moist and cool.

We must not forget how the primroses love moisture, and grow and flower well with quite a small amount of sunshine. And perhaps with the primroses you will like to grow some other beautiful plants of the same family called auriculas. These are so extremely beautiful and choice that often keen and enthusiastic gardeners make them their hobby flowers, as it were, and spend a great deal of time and attention upon them.

The thrifts will grow in dry spots; if we keep our eyes open when we go about we shall notice how well these flourish in the sandy soil of seaside places, and from this fact we can draw our own conclusions and decide that cool, moist positions will not suit them. All good gardeners make careful observation of the plants that flourish in different neighbourhoods, and take note of the nature of the soil wherever they may be.



Saxifrage Bluebell Sedum Veronica

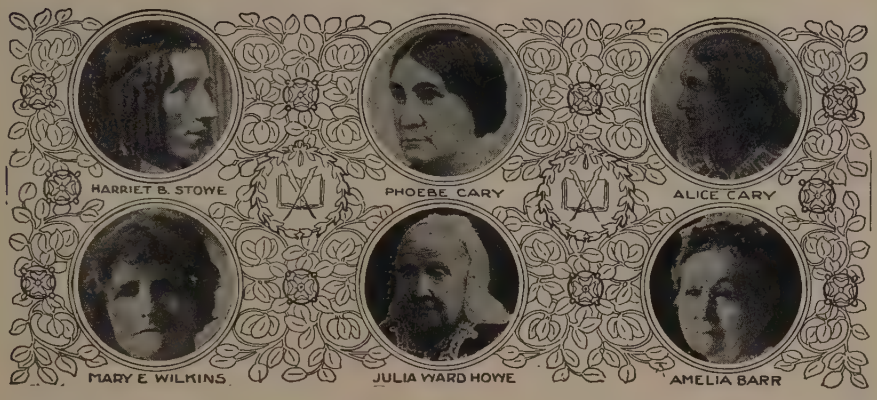
PLANTS FOR THE ROCK GARDEN

Some of the dwarf speedwells are grand plants for the rock garden, but if we search for them in a catalogue we shall have to look them up under the title of veronicas. There is no need, I think, to give you a longer list; for, after all, you can plant any of the pretty dwarf plants you can get in your rock garden and experiment with them.

It will be helpful if you make a point of finding out the kind of soil of which your garden is composed, because you will often read that such or such a plant flourishes in this or that soil. Is your soil of a peaty nature, or a clayey or chalky nature, of a loamy or sandy nature? Find the answer to that question, and you will be sure to benefit by the knowledge sooner or later. Besides, it is interesting to know, just as it is interesting to know if your garden faces north or south, east or west.

If it has not already been done, you might like to put up an archway over your pathway. It will be necessary to put the wooden supports a considerable distance down in the soil, and they last longer if this portion of them that has to be covered with earth is tarred. A honeysuckle or clematis or a climbing rose may be planted to cover it.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 2139



WOMEN WRITERS OF THE UNITED STATES

IN the early days of our country American women did not write for publication. Few were well educated, for only the boys were sent to college. The girls usually married young and family cares demanded their time and thought, as most of our modern appliances for making housekeeping easy had not been invented. There were no steam or hot-water heaters — no gas, no electricity, the open fires needed constant tending, and the tallow candles were made by the tedious process of dipping. The women accomplished a wonderful amount of spinning and weaving, baking and brewing. They sewed much with exquisite small stitches which the women of today fail to equal.

These pioneer women had active minds. Busy as they were, they loved to read. As the wild new country became settled and civilised, they found more leisure for books. Occasionally, and more and more frequently, some woman felt prompted to write a poem or a story. But about a quarter of the nineteenth century had slipped away before women's literary work amounted to much.

Mrs. Emma Southworth was among the earliest of our women writers, and one of the most popular for many years. Her books are still read, although not by the class of readers who enjoyed them at first. For taste changes and to educated people now, Mrs. Southworth's stories seem oversensational and florid.

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A POPULAR AUTHOR NOW FORGOTTEN

Dorothy Eliza Nevitte, who became Mrs. Southworth, was born in Washington, D. C., December 24, 1819. She was a gifted and charming girl who was married when very young, and very unhappily. She was still very young when she found herself in poverty with a little boy and girl to support. At first she taught in a public school and found it tiresome work. She was noted among her friends for telling entertaining stories and now she turned this talent to account. She wrote out her stories and sent them to the leading papers of the day, The Baltimore Visitor, the Philadelphia Saturday Evening Post, the New York Ledger. To her great joy they were so well liked that she was soon able to give up teaching. Mr. Robert Bonner, the well-known editor of the New York Ledger, made a contract with her binding her to write only for his paper, of which she was the most popular contributor for over thirty

years. The men and women of her day eagerly awaited each new tale from her pen and fairly clamoured for more. She wrote sixty-eight novels. Their titles, The Deserted Wife, The Lost Heiress, The Curse of Clifton, etc., suggest the romance and mystery in which Mrs. Southworth and her readers revelled.

The spirit of all her work is pure and high-minded. In criticising, it is only fair to remember that she wrote as she did because she was a child of her own time, and knew its taste.

THE MOST FAMOUS AMERICAN NOVEL

Harriet Beecher, born in 1811, was one of a big family of gifted brothers and sisters, children of the Rev. Lyman Beecher of Litchfield, Conn. There was not much money but somehow these clever boys and girls acquired fine educations, scrambled up through some hardships and privations to fill, most of them, useful and conspicuous positions.

Harriet became Mrs. Stowe and a busy wife and mother. She wrote a number of successful novels, Dred, Oldtown Folks, and others, but her lasting claim to remembrance rests upon Uncle Tom's Cabin, which stirred people to think of the great question of slavery.

In those days when household toil was so heavy and constant, American women appear to have been particularly fond of poetry. Perhaps they felt the need of its helpful uplift from everyday drudgery. Many of them published verse. Most of it is pretty, sentimental and meditative. It lacks force and vitality, and was soon forgotten.

TWO SISTERS WHOSE POEMS YOUR MOTHERS READ

Alice and Phœbe Cary are among the few who deserve to be remembered. Their beautiful hymns and other poems endeared them to English as well as American readers. These devoted sisters were born in an attractive country home — Mt. Healthy — near Cincinnati, Ohio, Alice, April 26, 1820, and Phœbe, September 4, 1824. Their father, a New Englander by birth, was one of the pioneer settlers of Cincinnati. They lost their mother when they were young girls, and the stepmother who came to govern the household was not always kind. She disapproved their favourite evening occupation of writing verse and would not allow them candles for it. So the clever young authoresses secured the necessary light by burning rag wicks set in saucers of lard.

Happily they possessed some money of their own. So when Phœbe was twenty-eight and Alice thirty-two, they sought a home and fortune in New York City. They were quickly successful in selling their writing, both prose and verse, to the leading magazines.

They were lovely and attractive young women, clever talkers, hospitable, and they very soon formed a delightful circle of friends. Their pleasant home became a favourite gathering place for the most cultivated literary and artistic people of New York.

The beautiful hymn by which they are perhaps best remembered — "One Sweetly Solemn Thought" — was written by Alice when she was eighteen. Their lives moved happily and successfully until Phœbe's death in 1871. Her sister was broken by this great sorrow and died shortly afterward.

A WOMAN OF ONE STORY

Another woman who, like Mrs. Stowe, is remembered chiefly for one story, is Maria Susanna Cummins. She belongs to the period of the Cary sisters, for she was born in Salem, Mass., April 9, 1827. Her father, Judge David C. Cummins, an able lawyer, believed in educating girls. He sent his bright young daughter to a private school and encouraged her desire to write. The great success of her life came when she published the Lamplighter, in 1854. It became immediately popular, and 40,000 copies were sold in two months. Everybody read it and talked about it. In England too it was immensely liked. The pleasant old story is still widely read. You may find it in nearly every public library with well-worn covers.

Yet it is a simple story, simply told. Readers' hearts were touched at once by the forlorn little waif adrift in the streets of New York, rescued by Uncle True, the kind old lamplighter, and

THE HOMES OF TWO FAMOUS AUTHORS

Most of you have read Uncle Tom's Cabin, and perhaps have wept over little Eva and Uncle Tom. During the latter part of her life, Mrs. Stowe lived in this house in Hartford, and took a leading part in the social and literary life of that delightful city, where so many literary people had their homes.

This is a picture of the home of Louisa M. Alcott, whose books you all probably know and love. It was here that she wrote the famous series of books telling the adventures of Jo and Meg and Beth and all the March family, and it is of this house that she tells in her stories.

Photographs copyright by Detroit Photographic Company.

enabled to grow up a good and lovely woman, deserving all the good fortune that finally comes to her. The story is told with warm-hearted sympathy which is the secret of its undying popularity. Miss Cummins was never able to repeat this one great success.

STORIES OF A DEPARTED CIVILISATION

Many of our early women writers were Southerners. Some of these began to write when very young. Augusta Evans was only fifteen when Harper Brothers published Inez, her first novel. She was born in Columbus, Georgia, in 1835. The life of the brilliant Southern woman is a record of success. She wrote many novels and her publishers were willing to pay well for what readers so eagerly demanded. For Vashti she received $15,000. Several generations of readers delighted in St. Elmo. Augusta Evans married Mr. Wilson, a wealthy railroad manager of Mobile. There he made her a beautiful home where she could indulge her love for cultivating flowers.

Southern people love Mrs. Wilson not alone for her popular stories. They never forget that during the Civil War she fitted up a house in Mobile as a private hospital and here tenderly cared for sick and wounded Confederate soldiers.

Another Southern woman worth remembering because her books have given pleasure to so many is Marian Harland, whose real name is Mrs. Mary Virginia Hawes Terhune.

A WOMAN WHO WROTE NOVELS AND COOKBOOKS

Mary Virginia, born in Amelia County, Virginia, about 1836, was educated with her brothers and sisters by tutors and governesses. She began to write when a child but for years kept her manuscripts hidden. She was eighteen when she published her first novel, Alone. It was followed by many others, pleasant entertaining stories which served their purpose and must some day be forgotten. Miss Hawes was about 20 when she married a gifted young clergyman, the Rev. E. P. Terhune, a very happy marriage until his death over 50 years later.

He was astonished to find his literary young wife such an able housekeeper. She herself said that her excellent receipt book, invaluable to many housekeepers — Common Sense in the Household — would do more good than all her other books.

Girls in this day of many new stories can scarcely understand the thrill of delight with which The Wide, Wide World was welcomed by the public in 1851. It is said to have been the most popular novel ever written by an American with the single exception of Uncle Tom's Cabin. The publisher felt doubtful about it, but his mother, who read it in manuscript, persuaded him to accept it. Her judgment proved good. A quarter of a million copies were sold. Everybody read it, young and old. The great French critic Taine could not understand how a three volume novel could be devoted to the moral progress of a girl of thirteen.

The author, Susan Warner, was born in New York, July 11, 1819. Her father, a New York lawyer and also a writer, owned Constitution Island in the Hudson River near West Point. Here she spent much of her life. She wrote many popular stories, of which Queechy and The Wide, Wide World have proved the most enduring.

THE MOST POPULAR WRITER FOR CHILDREN

A bright and shining name among our women authors is that of Louisa May Alcott. Every year her pleasant stories, Little Women, Little Men, Old Fashioned Girl, Eight Cousins, and the others, appear in gay new holiday dress to delight new generations of young people. She is perhaps the most beloved of all our writers. Louisa was born in Germantown, Pa., November 29, 1832, her father's 33rd birthday, the second child of an unusually gifted father and mother. The four sisters whom the world knows so well as the Meg, Joe, Beth and Amy, of Little Women did not have an easy childhood, for they were desperately poor. Their father, Bronson Alcott, was a Connecticut Yankee, but he had very little Yankee shrewdness. He was a philosopher who longed unselfishly to teach the world beautiful theories of life.

He did not find this a profitable business, and proved himself singularly unable to earn enough money to make his family comfortable. The burden of doing so rested mainly on his wife, one of the fine old Boston family of Mays, a woman of rare courage and energy. Very often the family had not enough to eat, and the girls, although they longed for pretty things, had to wear plain and shabby clothes. But as they all loved each other dearly and usually laughed instead of crying over their troubles, they managed to have a great deal of fun.

LIFE IN CONCORD WHEN MISS ALCOTT WAS A GIRL

Much of the time they lived in the old town of Concord, in Orchard House, later the home of the Hawthornes, and here they were fortunate in their friends, the young Emersons, Hawthornes, Channings and others bearing names which are well-known in American literature. Louisa must have been a delightful playmate. She loved to get up plays from their favourite stories, which she and the others acted in the barn, and sometimes Ralph Waldo Emerson, Nathaniel Hawthorne, Bronson Alcott and the other parents came to see these.

Louisa always loved to sew. She tells us that at ten she set up as a doll's dressmaker with her sign out and wonderful models in her window. She inherited her mother's practical sense and energy, and from a very early age she determined to make life easier for this dear mother. She began when very young to bear her share and more of the family burdens. She cooked and scrubbed and sewed. She tried teaching, not very successfully. She acted as companion to an invalid lady. Whatever she did she found time to tell and scribble stories and verses. Everything funny, romantic or picturesque appealed to her lively imagination and was stored up in memory for future use.

She was paid $5 for her first story, published when she was sixteen. After that came a long hard time of effort before success. Most of her early sensational little stories are forgotten. When she curbed her fancy and began to write of true experiences she began to succeed.

Hospital Sketches was her first real success. It told with sympathy, humour and pathos what she had encountered while nursing sick and wounded soldiers in the hospital at Georgetown. Stirred by pity and patriotism she had insisted upon undertaking this nursing, which cost her health, for she was never as well afterward. But in some ways the remainder of her life was comparatively easy. One success led to another. Little Women was prodigiously popular. It was translated into French, German and Dutch and it was greatly liked in England.

A STORY OF HOLLAND BY AN AMERICAN

Probably most of you have read the delightful story, Hans Brinker or the Silver Skates. Translated into French, German, Russian and Italian, it has charmed the children of many countries. We know its author for other pleasant stories and for much pleasant verse for children. Mary Mapes, later Mrs. Dodge, was born in New York in 1838, and grew up among the best social, literary and artistic influences of her native city. She married Mr. Dodge, who soon died and she then returned to her father's home with her two small sons.

Mrs. Dodge was a delightful mother, a real playmate. If she found her boys growing interested in a particular subject, she quietly studied it, to help them and to share the interest. She was gifted in many ways, an able musician, skilful in drawing and modelling, and with unusual business ability. She had been contributing to the magazines for some time, and had some editorial experience when the St. Nicholas was organised in 1873. She was invited to become its editor and filled the post acceptably for many years. She chose the name which was to become dear to thousands of boys and girls.

THE FRIEND OF THE INDIANS

Helen Hunt Jackson deserves to be remembered both for her prose writings and her poetry. She has written some delightful tales for children, such as The Naughtiest Day of My Life, and Nellie's

Silver Mine. She must have been a delightful child herself, impulsive, warm-hearted and imaginative. Her father was a professor of languages and philosophy at Amherst College, and she had fine educational opportunities. From her mother she inherited a happy and buoyant nature, which kept life always interesting to her even when it was hard. For it brought her much sorrow. Her young husband was killed by the explosion of a torpedo with which he was experimenting. Her little sons both died and her health broke down.

At Colorado Springs, where she had gone in search of health, she met and married William Sharpless Jackson of that place. She soon became interested in the Indians and the wrongs they had received from our government. So strongly did she feel that she returned to New York to study Indian matters at the Astor Library. She then wrote A Century of Dishonour, of which she gave a copy to every member of Congress. Congress then appointed her a special commissioner to investigate Indian affairs and one result of this work was her brilliant novel Ramona, a story of the Mission Indians of California.

We claim Frances Hodgson Burnett as an American author because she loves our country and lives here, but she was born and lived the first 15 years of her life in England. After her father's death in 1865, his wife brought her family across the Atlantic and settled in Tennessee.

THE AUTHOR OF LITTLE LORD FAUNTLEROY

Frances Hodgson was born with a genius for telling stories. She never had to learn the art. From the time she was a tiny school girl she delighted her playmates this way. The family were poor and she naturally sought to make her gift profitable. She had published a good many stories before fame began to come to her with Surly Tim's Troubles, published in 1872. From that day her success has been unvarying.

She has never excelled That Lass o' Lowrie's, a brilliant story of mining life. Most boys and girls have read her delightful and perhaps best known story, Little Lord Fauntleroy. It remains one of the most popular of children's books. Dramatised, the story had equal success on the stage. Fauntleroy curls, and Fauntleroy costumes became popular for little English and American boys. The delightful little lord still stands for what is most charming and picturesque in childhood.

Elizabeth Stuart Phelps, the gifted New England woman who wrote Gates Ajar, which deals with life after death, was four years old when her father became Professor at the Theological Seminary, Andover, Mass. She inherited his student tastes and grew up devoted to books and with a burning desire to help the world. She began to write when only 13 and has published many stories both long and short. In the Story of Avis, Madonna of the Tubs and A Singular Life, she shows a wonderful sympathy with the suffering hearts of men and women, and also with animals. For many years she has been one of the most popular of our magazine writers. Since her marriage to Mr. Herbert Ward, also a writer, she has lived in Gloucester.

THE BATTLE HYMN OF THE REPUBLIC

You may read of Mrs. Julia Ward Howe elsewhere in this book, of her famous and stirring poem which quickened the lagging steps of weary soldiers in our Civil War, The Battle Hymn of the Republic. It was her greatest contribution to American literature but in her long and useful life she found time for much other writing as well as for much lecturing and philanthropic work.

When about 24, she married Dr. S. G. Howe, and went to live in Boston. She was a devoted wife and mother. Delightful socially, her home was always a gathering place for many friends.

Some of our ablest writers have been wise enough to see that human interest lies everywhere. They owe their success to the fact that they have been so keenly interested in the people and places that they know best, that they have been able to tell us about them with charm and vividness.

An unusually sensitive and observing little girl who grew up to do this, was born at South Berwick, Maine, September 3, 1849. Her name was Sarah Orne

Jewett and her father was a well-known doctor and surgeon. New England country folks are said to be very reserved and hard to know. You cannot read her stories, Deephaven, Country Byways, The Country of the Pointed Firs, without feeling well acquainted in a delightful cordial way with the seafaring men and the busy stay-at-home women of whom she tells us. She is one of the pleasant magicians of the pen who "holds the mirror up to nature" and shows what most of us are not clear-sighted enough to see for ourselves.

Stories of the Tennessee Mountains

We know about the hard and simple lives of Tennessee mountaineers and of their beautiful mountains from The Prophet of the Great Smoky Mountain, In the Tennessee Mountains, and other stories by Charles Egbert Craddock, whose real name is Mary Noailles Murfree. Her home was near Murfreesboro, which was named after her great-grandfather, a gallant soldier of the American Revolution. The family spent the summers among the mountains, and Mary, who was lamed by an accident when a child and unable to lead an active life, amused herself by studying the mountaineers and their ways, and when still very young she began to write about them.

As she signed a man's name to her stories and wrote in a vigorous style all thought for some time that her work really was by a man.

Those who love stirring romance, tales of adventures with wild beasts and Indians and lawless men, delight in the stories of Mary Johnston. This gifted Southern woman has been an invalid much of her life but she is able to divert her quiet hours with wonderful imaginings. She seems to see so vividly all that she describes, that her reader feels caught into a wonder land of colour and adventure. Miss Johnston is a great student of American history, particularly the history of early Virginia. She throws a spell of romance over the early days in her novels Prisoners of Hope, To Have and To Hold and others Recently she has written two thrilling stories of the Civil War.

A Girl Whom You All Love

That delightful girl, Rebecca of Sunnybrook Farm, has a very wide acquaintance with young and old readers. So has Timothy of Timothy's Quest and The Carols, of that lovely story The Birds' Christmas Carol, and other pen children of the same delightful author.

Perhaps Kate Douglas Wiggin writes so delightfully for and about children because she has long loved them and worked for them. She was only seventeen when she left her home in Philadelphia, where her father was a lawyer, and went out to San Francisco to study kindergarten work. She organised a kindergarten there, and later with her sister, Miss Nora Smith, organised the California Kindergarten Training School. She married in San Francisco, Sam R. Wiggin, a lawyer, who died nine years later. Her books of travel are very entertaining and many stay-at-homes have been abroad in imagination with her Penelope of Penelope's Progress. In 1895 she married Mr. George C. Riggs of New York, which city has since been her home.

Doctor Lavender and His People

Just as Miss Johnston's stories hold us by their bold vigour, Mrs. Margaret Deland's hold us by their quiet charm. What is striking and unusual and picturesque interests her much less than the study of human nature, or finding out why ordinary, everyday people act just as they do. She sees and makes us see their mistakes very clearly, but never without kindliness. She has loved to develop one special community, a small town of Pennsylvania which she calls Old Chester. Some of the personages of this place appear many times in different stories until they have come to seem very real to her readers. Many love Dr. Lavender, the fine unselfish old clergyman, who has a part in nearly everything that she has written.

Another girl who grew up thinking and dreaming a great deal about the lives of the people about her was Mary Wilkins, later Mrs. Freeman. She grew up in a New England factory town where she saw many overworked and poverty-

stricken men and women, and a great deal of human misery. She felt the grimness of life, and this same sense of hardship and grimness has found its way into most of her stories.

Her first story, A Humble Romance, the experiences of a poor little bound-out girl rescued from drudgery and married by a kind-hearted tin pedler, attracted much attention when it appeared in Harper's Magazine. Her stories at once became popular. She has written a great deal, but her short stories are better than her longer ones.

A STORY WHICH HAS MADE THE WORLD LAUGH

Life brings cares and perplexities to all of us as we grow older. When some one writes a tender, loving book that is cheering and encouraging and entertaining it is eagerly welcomed. This is what Mrs. Alice Hegan Rice did in Mrs. Wiggs of the Cabbage Patch. Mrs. Rice is a Kentucky woman, living, since her marriage to Mr. Cale Rice Young, the dramatic poet, in Louisville, but spending much time in travel.

Mrs. Wiggs, her most famous story, has been widely translated. It is also published in raised type for the blind so that they may spell out its cheerful lessons of courage and good will with their nimble fingers.

Grace King is another gifted Southern woman. She too writes about the part of the country and the people with which she is most familiar. She is a New Orleans woman and well versed in the history of old Louisiana, as her Mr. Motte, Tales of Time and Place and Balcony Stories show.

Ruth McEnery Stuart is one of the writers whom we enjoy because she tells us tales so pleasantly of the coloured people whom she knows and understands because she has lived among them most of her life. She was born in Avoyelles Parish, Louisiana, and went to school in New Orleans. Her dark eyes look very kindly out at the world and no matter how hard life is she is always able to find something humourous and cheering in any situation. She is a greatly valued contributor to our leading magazines and her Sonny stories are as popular as her darkey stories.

THE BOOK OF A BLIND GIRL

We have all heard of Helen Keller, the wonderful young woman who although deaf, dumb and blind has succeeded in getting a more thorough education than most people accomplish with all their senses. She keenly enjoys life and in spite of her afflictions is an apostle of good cheer.

She has told her remarkable experiences in her interesting book The World I Live In. But it is not only for her heroism in overcoming her mighty handicap that she deserves mention. She has shown poetic ability. Read the Story of a Stone Wall and stop to think whether with your two eyes you could have perceived as much or described so cleverly what you perceived as blind Helen Keller has done.

THE WOMAN WHO WROTE OF A NAUGHTY BOY

When The Madness of Philip appeared in one of our magazines, readers found the story of the naughty kindergarten child very amusing. It was written by Josephine Dodge Daskam, a New England girl, who shortly before had been graduated from Smith College. She followed it up with many others dealing with child life with a great deal of humourous understanding. She set the fashion of writing stories about children for grown people but has also written about older people very successfully. Now she is Mrs. Bacon with children of her own.

Times have changed since American women began their energetic effort to win a place in literature. Instead of the occasional writer, we now have so many that we cannot keep track of them all. We have few geniuses, but many able artisans. The woman professional writer has been developed for the amusement and instruction of the public.

One great achievement in which our women writers have greatly helped is that we all understand each other better than people did 100 years ago. We have begun to realise that north, east, south and west, in crowded cities and solitary country places, human nature is after all very much the same.

THE SINGING BIRDS

CONTINUED FROM 1960

WHEN we have been listening to one of our greatest singers, the highest compliment we can pay the vocalist is to say that he or she sings like a bird. It is a wonderful thing that men and women, with all their art and all the knowledge of voice production which ages of training have afforded them, regard the little feathered songsters of the grove as the highest of all masters of the art of singing. Nearly all birds have voices, but they do not all use them for making music. We may lay down a general rule that the handsomer the bird is, the less beautifully he sings. Why is this so? The answer tells us the whole story of a bird's song.

The song of birds is chiefly the birds' way of telling their love for their mates, or for those which they wish to become their mates. The birds with rich, handsome plumage, or the desperately brave birds, capable of fighting great battles with their rivals, attract the female birds by displaying their lovely feathers, and then by fighting other birds which dare to compete for the love of the lady. The birds which have not gay feathers depend upon the beauty of their song. Birds love birds' singing, and the males which sing best draw to them the females whose love they desire to possess.

How do the birds make their beautiful melody? They play upon a perfect musical instrument, as a man with an oboe or other reed instrument plays upon his. The voice may be produced at the bottom of the trachea, or windpipe; or from the place at which the windpipe branches out into the tubes in the lungs, called the bronchia; or in those bronchia themselves. At the point where the two bronchial tubes join there is a tiny elastic membrane. The air from the bird's lungs causes this membrane to vibrate in the windpipe, just as the reed causes the air to vibrate in the pipe of the oboe.

An oboe is not elastic, and cannot of itself utter more than one note. To alter the pitch of the oboe's notes, we have to make holes in the tube, and by stopping these with our fingers we make the vibrating column of air in the tube longer or shorter, as we wish, so altering the pitch of the sound. The bird's windpipe requires no holes or stops. By exercising certain muscles, the bird can lengthen or shorten the tube, squeeze it, or make it looser, and produce an almost endless variety of notes.

Baby seals make a great fuss about going into the water the first time, just as if they were small human beings objecting to a bath. Baby seals, like baby people, have

to be taught to like their bath. In a small measure, birds have to be taught to sing. The voice is there, but not the knowledge of the song. They would sing some song, but whose? A chicken reared in an incubator, and never seeing its parents, chirps and chirrups away as soon as it is born, just as if it had been reared by its mother in the hay nest of a farmyard. It does not try to quack if a duck should hatch the eggs, nor does a duck crow or cackle if hatched by a hen. But many little singing birds, if brought up by strange birds, actually take the song of their foster-parents.

THE LINNETS THAT GREW UP TO SING THE SKYLARK'S SONG

Many years ago a gentleman placed the eggs of linnets in a skylark's nest, and there they were hatched by the skylark. The little linnets, when they grew old enough to sing, learned the song of the male skylark; they did not sing the song of the linnet. Other little linnets were brought up by woodlarks, and they sang the song of the woodlarks; and others, reared by titlarks, sang the song of the titlarks. When they grew up and were placed in cages near ordinary linnets, they kept to the song of their cradle.

But we must be careful not to run away with the idea that all birds copy the song of the birds in whose nests they are reared. What about the cuckoo? The mother cuckoo lays her eggs in the nests of more than half a dozen different birds, but no cuckoo ever tried to copy the note of the birds which reared it. A young canary will undoubtedly copy the note of the birds about it, but if it never heard another bird sing it would in course of time sing some sort of song. It might not be the glorious song which the well-trained canary utters, but it would still be a song which we should not mistake for any other bird's.

THE BIRD THAT SINGS IN A CAGE, AND THE BIRD THAT FILLS SPACE WITH SONG

When we read—as we all must—the books of the great writers and poets who have made the English language so rich in its literature, we continually find the names of British song birds mentioned; and many of the sweetest and most familiar poems refer to them, when they are not devoted to one or another of them altogether. It is well, therefore, to learn something about these famous and familiar birds of the land of our forefathers, and of the continent of Europe. Here we have an excellent account of them.

We need not have any doubt as to which is the finest of European song-birds. It is the nightingale. Millions and millions of people in this country have to take the word of others for this statement. The nightingale does not come to us until about the middle of April, and two months afterwards it has not a note of its song left. It does not visit Scotland; it does not visit Ireland. It goes to only two parts of Wales, and seldom reaches a part of England north of Yorkshire; so there are more people who do not hear it than there are who do hear it. Another reason why so few people hear it is that, if it should be singing in the daytime while they are about, its song may be drowned by the chorus of other birds; while at night, when it is singing alone, most people are in bed.

THE LIFE OF THE NIGHTINGALE, AND WHY IT SINGS IN THE NIGHT

The nightingale is related to the robin and the song-thrushes, and is about the size of a wood-thrush. It is quite a sober-looking little bird, but there is a beauty about its head and full eye which would make us admire it even if we did not know its name. The males are the first to arrive in England. They appear a week or ten days in advance of the females. They go to the same places year after year. In the most wonderful way they come straight over the sea and straight inland to the very bush or thicket or tree in which they were born or in which they have previously made their nests.

It is when the female birds arrive, and from then until the courting is done, until the eggs are laid and the little ones hatched, that the male nightingales sing their marvellous song.

First of all they sing to attract a sweetheart. Having won her, they sing while they are building their nests. While the mother bird is sitting on the nest the male bird sings almost night and day to cheer her. But when the little naked babies come forth from the shells the song ceases. The father bird has to help to find caterpillars,

SOME OF ENGLAND'S CHIEF CHORISTERS

The stonechat is a busy little insect-eater. It belongs to the chat family, of which there are thirty-six species, all small relations of the thrush. These are the birds called stonechats, but really the wheatear is the true stonechat.

The blackcap comes next to the nightingale as a songster. It is one of our most welcome summer visitors.

The nightingale arrives in April and sings its magic song until the middle of June, then sings no more.

Wheatears are the true stonechats. The males sing from dawn till dusk. They hide their nests cleverly.

The robin dwells with us winter and summer, the friendliest little bird, with a grand song and cheerful spirit.

A fine builder is the musical reed-warbler. It builds its nest on rushes, just as if they had grown through it.

The rose-grower's friend is the whitethroat, which eats the green fly and sings a fine song.

The sedge-warbler is the commonest bird along the marshy banks of the Thames. It loves reeds and willows for its nesting-place.

The whinchat, an insect-hunter, darts out from hiding, catches its prey, then hides again.

ants' eggs, little worms, and tiny beetles with which to feed his hungry family. He has no time for singing, and he could not sing if he had the time. His voice seems to go from him, and he has nothing left but a little frog-like croak. If the nest of the nightingale should be robbed soon after the eggs are laid, the nightingale will sing while another is built, and until that lot of eggs is hatched; and very rarely he may sing while a second brood is hatched. Generally speaking, however, his song is not heard after the second or third week in June.

THE MELODY THAT STIRS THE TRAVELLER IN THE COUNTRYSIDE BY NIGHT

It is worth going miles to hear a nightingale. There is no other song so wonderful, so thrilling, so beautiful.

Listen to the most beautiful canary; listen to its long-drawn, liquid notes, then imagine those notes in a far fuller, far more exquisite tone, sung by a mysterious bird hidden in a thicket under the starry midnight sky. The long notes and the warbling, rolling notes of the canary do suggest the nightingale, but only faintly. The nightingale is a shy, nervous bird, though he makes his nest near the home of man. But when he has once started his song he seems so carried away by the love of the mate for whom he is singing, and so to glory in his own melody, that then he will sing away regardless of danger. That helps us to understand the following little adventure. A man who had during different years walked many miles to hear the nightingale, and had never succeeded, was told to go to a certain place where the bird might be heard. It was very late at night as he walked up a country lane, and though he crept on tiptoe along by the copse in which the birds were said to be, he could not hear a sound.

HOW A NIGHTINGALE WAS TEMPTED TO SING IN A COUNTRY LANE

He waited a long time, feeling very disappointed. It was just like his experience on previous occasions. "I never shall hear a nightingale," he thought to himself as he turned to walk home. He strode boldly along, for there was no use in being cautious now. But as he walked his foot struck a stone, sending it rattling across the road. He heard a little "tweet" in the thick trees beyond the hedge which he was passing. It was a little cry of alarm, a note of warning uttered by one bird to another. Ordinary birds would not be on the watch at this late hour, thought the man. He stood perfectly still for a minute or two, but not another sound did he hear. Being used to the ways of birds, he tried a little trick with which he had often started canaries and other birds singing at home. He whistled in imitation of the canary. It was a soft, low note that he whistled. In an instant there came a reply from the trees. He whistled a little louder, and the bird made a bolder reply. Again and again he whistled, uttering all the bird-notes he could. Each time there came a little longer and louder reply from the trees, and at last there followed such a burst of song as that man had never before heard. It was the song of the nightingale. The bird had regained confidence, and it poured forth its song so fearlessly that the man was able to hurry home and take his friends to hear the wonderful melody.

THE BLACKCAP AND THE ROBIN, THE MUSICAL COUSINS OF THE NIGHTINGALE

When we see a little black-headed bird with a greyish body swallowing numbers of ripe berries of the ivy, we ought to watch while it finishes its meal, then, if possible, follow it to the place where it perches. It is one of the loveliest of all the singers that visit us. It is the blackcap warbler, a relative of the nightingale, and, like that king of song, a good friend to us because of the great number of caterpillars and insects it eats. Arriving here in April, after spending the winter in warmer lands, it stays till September, and in that time rears two or three broods of little ones, of which the first lot are generally male birds, and the later broods females. This, by the way, is the order in which many wild birds are born. The blackcap has not only a beautiful song of his own, but can imitate other songs. When caged and friendly with his master, he will learn tunes whistled or played to him.

Another relative of the nightingale is our little garden friend, the robin. His home is in England. This does not mean that there are no robins in other countries. Robins are to be seen in most parts of Europe, but those that we

SONGSTERS OF EAST AND WEST

The fieldfare comes to England in winter, when other birds are leaving. It lays its eggs and rears its young in lands where the summer is cool.

The young birds in the nest might pass for thrushes, but they are baby blackbirds. The adult male blackbird is a handsome black-coat. The female is a rusty brown, and spotted on the breast. All the young ones are just like her until they have moulted their nest feathers.

The yellow-hammer is a gay bunting. It has a merry little song, which sounds, when put into man's language, like "A little bit of bread and no che-ee-se." It is a yellow and brown bird, and stays all the year.

The skylark, though it nests humbly in the grass on the ground, is the highest flier of the song-birds.

The thrush soon finishes its summer moulting, and renews its song when nearly all other birds are mute.

Gifted with a glorious song of its own, the mocking-bird mimics everything, from an eagle to a hand-saw.

The red cardinal is the nightingale of the warmer parts of America.

Jenny wren is always a favourite, for its beauty and for its cheerful song.

The redstart is like a stonechat, but far handsomer. It feeds on insects.

The photographs on these pages are by Charles Reid, R. B. Lodge, J. Williamson, and Underwood & Underwood, London.

have in this country do not migrate to other lands. They are here all the year round, and dear to us for many reasons. Who does not know the robin with his bright red breast, his brilliant, full eye, his saucily cocked tail, his confident manner, and his song so sweet?

ROBIN REDBREAST AT HOME IN AN OLD BOOT OR A WORN-OUT HAT

He is to be found in every garden. He builds in the ivy, in the bushes; he builds in the sleeves and pockets of old jackets hung up and forgotten in some outhouse. He builds in an old can or a boot or worn-out hat. The very things which are set up as a warning to other birds, the scarecrows in the fields, are a welcome home to the robin. Anything which has been left by man seems to the robin to be set apart for robins.

He is man's greatest bird friend. Any other wild bird flies away from us as we approach, but master robin flies *towards* us. When we work in the garden it is he who comes and stands by us to snap up the insects, grubs, and worms that we may turn over in our digging.

There is a very close friendship between man and the robin. But we must never attempt to cage a robin. He would die of misery if alone, and if kept with other birds, even with other robins, he would fight and kill them. Young robins which are strong enough will fight old robins, and, if they can, will kill them; and old robins will kill young robins if their paths cross.

It is unfortunately true that our little friend is the most vicious of all the garden birds. Wise men have wondered how this is. The fact that young robins of the same nest fight against each other is not altogether surprising, for all birds fight. Watch young chickens and we see that at once; if one of them turns weakly the others will kill it.

HOW ROBIN REDBREAST SINGS MERRILY THROUGH THE WINTER SNOWS

Well, this is what the wise men think about the nature of the robin. For ages and ages the robin has made himself the friend of men. In the old days, before glass was discovered, when there were no windows to the houses, robins would fly through the openings and make their nests and find their food in the rooms. Now the robin, claiming man as his special friend, is jealous of other birds which approach his friend, and tries to frighten them off by attacking them. Does not a dog do the same thing?

With all his faults, we love the robin. All birds cease to sing after the full heat of summer sets in. After the rearing of their little ones they moult, and in that time do not feel well enough to sing. The cheerful robin is the first to begin to sing again. He may begin in August or September; he is in almost full song by the beginning of October, showing the joyful thrush how to tune up and defy the gloomy thought of the dark winter days to be. He is not at his best in song until February, but all through the winter his brave little heart impels him to sing of the good days that are coming, as if to tell his friend, man, not to mind the nip and harshness of the present winter days, but to look forward to the gladder times that lie ahead when his full song shall declare that "Spring is here with its thousand treasures."

THE WHITETHROAT, THE WHEATEAR, THE SEDGE-WARBLER, AND THE STONECHAT

Now comes another of the nightingale's little kinsmen, the whitethroat, a glorious singer. The general colour of the bird is greyish, though it is tinged with brown on the back and is white underneath. The length of the body is about three inches and the tail about two and a quarter inches. Like the robin, it lives mainly on insects and caterpillars, until the autumn, when it will take berries and fruit. When singing, the whitethroat ruffles up the feathers round his throat and his head so that the latter appears crested.

Its food resembles that of another pretty songster, the wheatear, a bird of the same size, but whose feathers are light to dark grey on the head and neck, brownish-grey on the wings, on which appear grey feathers edged with yellow. Underneath the bird is mainly orange-brown, but in the tail are white feathers tipped with black. The wheatear spends the spring and summer with us, but cannot endure our winter, and so must fly over the sea to where the air is warmer. There are several sorts of wheatears. The common one is called the stonechat as well as other names. This is rather confusing, for there is another fine little bird which spends the summer with us known as

the stonechat, a merry little bird, having a red breast like the robin, but black on the throat and upper parts. This one generally goes away for the winter, but at the same time other members of the same family come to us to escape the greater cold of the winter in the lands where they have spent the cooler summer.

All these birds of which we have been reading belong to the family of warblers. There are many of them, the hedge-sparrow, the redstart, the reed-warbler, the sedge-warbler and others. The sedge-warbler is more common than the reed-warbler. It nests in thick reeds or willows near the water, whence its cheerful song may be heard, in the season, early and late.

The reed-warbler is one of the bird architects. It plaits its nest on the stems of reeds or rushes, three or four of them becoming part of the nest. The grass and leaves and wool of which the nest is made are twisted about the stems, which look, when all is finished, as if they had grown through a nest which had been already made. The nest is deep and cone-shaped, so that, no matter how the wind blows, the cradle will not fall nor the little ones in it be in danger.

THE CRUEL SHOWMEN WHO DESTROY THE SIGHT OF BIRDS TO MAKE THEM SING

Now we pass to the finches, a big and interesting family, containing some of the most attractive birds. Let us take the chaffinch first. The bird-fancier will tell us that it is not a finch at all, but a sort of link between the finches proper and the buntings. It is a splendid-looking bird, with fine colour, and a crest which can be raised at will. It eats insects and vegetable food, and for the latter it pays a heavy price to the stupid farmers, who shoot it. The farmers forget that the chaffinch destroys an enormous number of insects.

Chaffinches are often caught and tamed. They sing beautifully when once they have got used to confinement. In some places men have contests between their chaffinches. The bird sings a song in which the notes generally follow in regular order, and the bird which utters most notes without a stop wins the prize. But there is a frightful scandal behind these competitions. Most of the birds which sing in them have been blinded by their owners. These cruel monsters draw red-hot wires across the eyeballs of the birds, completely destroying their sight.

THE PITILESS MEN WHO CATCH THE ORTOLAN, AND THE LITTLE BIRD'S SAD END

Then the poor things are taken to the place where the contest is to be held. A cloth covers each cage. When this is removed the bird cannot see, but it hears the twitter of another chaffinch, and thinks that it is again free in its native grove, being challenged to combat by a rival songster. And that is why the poor blind birds pour out their hearts in song, seeking to make their music better than that of the other little victims which they hear.

Having spoken of buntings, we had better note them here, though not all of them are good songsters. The one that we see in the farmyards in winter, hopping about with the chaffinches and sparrows, is the corn-bunting, which in the summer lives in the cultivated fields, and is caught in large numbers by the wretches who snare larks. It is taken in the same nets with those little princes of song. One of the buntings is the ortolan—a bird which breeds in great numbers in Europe, but rarely visits England.

The ortolan is a handsome little bird with a curious song, but nobody seems to care about it, except as a delicacy for the rich man's table. Thousands of the birds are caught in nets on the Continent, then sent alive to England, where they are kept in wretched baskets or cages in dark rooms, and fed to make them very fat, ready for eating. That is the fate of every ortolan which is caught by these pitiless men.

MERRY LITTLE BUNTING BIRDS AND THE BULLFINCH WITH THE GAY RED BREAST

The snow-bunting comes to us in winter, but our summers are too hot for it, so it returns then to the Arctic Circle. The reed-bunting is like the nightingale in so far as singing at night is concerned. While the female is sitting on her eggs, the male bird perches at her side, and carols the dark hours away. Another famous bunting is the yellow-hammer—a biggish bird, bright yellow and brown in colour. It has a merry song, and is supposed to sing "A little bit of bread and no cheese."

Keeping to the finch family, we must

take a peep at that handsome blackcap, the bullfinch, with his gay red breast and shiny black tail and barred wings. He has a strong beak for so small a bird, the reason being that his favourite food, when he can get it, is fruit-buds. That raises an interesting point as to whether he is more a friend than an enemy to the fruit-grower. A couple of bullfinches have been known in the course of two days to take every bud on a big plum-tree. That is very bad for the man who has only one tree; but their habit is not to eat all before them on one tree, but to take a few buds here and there.

WHEN THE BULLFINCH FORGETS HIS SONG AND LEARNS HIS LESSON AGAIN

If the bullfinches did not take them, the gardener would have to prune them away. A skilful man cuts thousands of buds from his trees, for if he does not the trees will never be able to ripen them, and the fruit will be poor and small. The bullfinches, therefore, help the grower in pruning. As a songster the bullfinch is a greater artist in captivity than when free. His natural song is not much to boast of. If caught when young, he can be taught to whistle any tune, and whistle it most beautifully. The funny thing is that the first time he moults he may quite forget his song, and have to re-learn it. He is an affectionate bird, and when regularly fed by one person gets very fond of him, and will not go away, even though given his freedom.

It may surprise some of us to remember that the canary is a finch. Look at the greenfinch, the cousin of the linnet and of the canary, and then we understand. In its native home, in the Canary Islands and elsewhere, the canary is coloured very much like our greenfinch. It is by the careful selection of birds that men have got the yellow canaries. Those which have brown and green about their feathers have had linnets or goldfinches among their ancestors. The red ones have been fed, when moulting, upon cayenne. There are no wild yellow canaries.

THE MANY KINDS OF FINCHES AND THEIR MELODIOUS SONG

The canary has the most beautiful song of any ordinary cage-bird, and some of its notes, as we have already read, are really like those of the nightingale. They are dear little birds to keep, and live for many years. One which lived in Hertfordshire when this story was written was already fifteen years old, but it was singing splendidly, and behaving towards its master and mistress with all the affection and intelligence of a pet kitten. The linnet—another finch whose song resembles that of a canary—has red on his head and breast when wild. After being caught it loses its red feathers at the first moult, and becomes quite brown all over. We must not forget the brambling, or mountain finch, which comes to gladden us in the winter. Nor must we overlook that handsome favourite the goldfinch, which is a joy to see as it whisks along chasing the thistle-down it loves, all the while uttering its melodious song. It cannot be mistaken for any other bird, its orange tints making it noticeable.

Of course, stupid farmers shoot it, yet few birds do more good for them. In the spring and early summer the goldfinches devour swarms of harmful insects, and later in the year they live entirely on the seeds of weeds, which are among the plagues of the farmer's life.

THE BLACKBIRDS AND THRUSHES, THE LIVELY SONGSTERS OF THE GARDEN

We come next to two charming related birds, the blackbirds and thrushes. The blackbird is a thrush, but the thrush is not a blackbird. The fieldfare and redwing, too, belong to the thrush family. The largest of the family is the mistle-thrush, but its song is not so rich as that of the song-thrush. It is beloved by aviary-keepers for the readiness with which it will bring up the young of other birds which have died. After the nesting period, however, it is apt to be vicious with birds smaller than itself.

Some people like the music of the thrush almost as well as that of the nightingale. We may smile at it, but the beauty of the thrush's song can be proved when we are listening for the nightingale. In a certain copse there are nightingales, thrushes, and blackbirds. Now, when the nightingale is in song, we drive in the daytime to this place to hear it. As we draw near, we hear a bird trilling away with great power and sweetness. "Is it the nightingale?" we ask ourselves. "Yes, it is," we say at first. But we listen and listen as we draw nearer, and we find that it is

WARBLERS OF THE AVIARY AND THE GROVE

One of the handsomest birds, the chaffinch, is a grand songster and builder. It is a devoted parent, and all day carries caterpillars to its young ones Cruel monsters trap the males and blind them to make them sing.

The bramble finch is called also the mountain finch. It is like the chaffinch, but less gaily coloured.

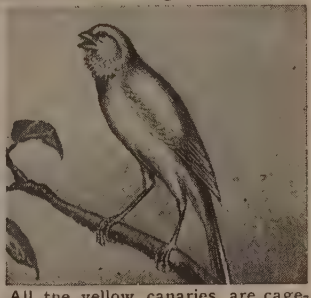
Linnets have a good deal of red about them when wild, but they become mottled brown in captivity.

Bullfinches are not great singers when wild, but when happy in captivity they can learn any tune.

The goldfinch is an even finer singer than the chaffinch, and thousands are caught and caged.

The common bunting is one of the birds which stay with us all the year round. Nesting in the grass, it is often mistaken for a lark or pipit.

Reed-buntings are far finer songsters than common buntings. While its mate is sitting on her nest hatching the eggs the male sings nearly all night.



All the yellow canaries are cage-bred. There are no wild yellow ones. The canary is a member of the finch family and a great home pet.

not the nightingale ; his famous liquid notes are missing, those notes which none but he can utter. But the other parts of the song of the thrush—for he is the singer—are so fine that we mistake them in the distance for those of our grandest chorister. The thrush may become a little tiresome by the unwearying way in which he will utter call after call in notes which become as regular and monotonous as those produced by a machine. Still, we cannot have everything we want, and we must be thankful for what the thrush is content to give us.

HOW THE BLACKBIRD DESTROYS OUR ENEMIES AND STEALS OUR CHERRIES

Next to the robin, the thrush is the most cheerful of all our songsters. He soon gets over his moulting, and by the end of October is joining little redbreast in an anthem of hope and goodwill.

The blackbird, cousin of the thrush, is the larger bird of the two, and very handsome, with his sheeny black feathers and his orange-coloured beak. He is a great songster, with his loud, mellow piping, but he is not so good a performer as the thrush, because in his song occur harsh, unlovely notes which crop up in the middle of some fine strain, making it all ridiculous. In gardens and orchards, where they are not persecuted, blackbirds and thrushes congregate in great numbers. Fruit-growers do not love them, for they undoubtedly do great damage to fruit. Earlier in the year they work like giants for the farmer by eating snails and worms and grubs, but when the fruit is ripening they play havoc. In one big garden, not a single ripe pear or apple was picked which had not been bored by the sharp beaks of these hungry birds.

* GREENFINCH AND NEST

Let them have the run of a cherry-orchard, and they are worse still. They are always hungry, and a gentleman who grows many cherries reckons that these birds take a third of his crop. He bought a gun to fire at them, not to kill them, for he did not use shot, but simply that the bang might scare them away. At first it frightened them greatly, but soon they got used to it. He would go out and see the birds in the trees gobbling down his cherries. They would see him, too, and they did not wait to be fired at. Each bird would snatch off a cherry and drop with it in its mouth to the foot of the trees, and cower down among the grass there while it ate its stolen fruit, then fly away with shrill pipings and chatterings.

America has a bird called a thrush which is not a thrush—the mocking-thrush, or mocking-bird. It is the most wonderful of all song-birds. It has a glorious song of its own, but it is not content with that ; it mimics the song and cries of every other bird. It can copy a nightingale's song, it can utter the harsh shriek of the eagle, the cackle of poultry. It can bark like a dog and mew like a cat. It can imitate the sound of a saw, the creaking of rusty hinges, the blows of hammer and mallet. It never imitates the human voice, though it will learn a long tune whistled to it. The mocking-bird is common in America, and is much prized for its wonderful gifts, and admired for the courage with which it defends its young from birds of prey and from snakes and cats. In size it is rather larger than a thrush. It comes between the wrens and the family to which those splendid songsters, the bulbuls, belong.

In praising the birds for their song in winter, we must not forget the little wren. This is, indeed, a happy little creature. Its sweet song may be heard for the greater part of the summer, and, once the bird has done moulting, it needs but the faintest flicker of sunshine on a winter's day to set the feathered mouse trilling.

HOW THE WRENS CUDDLE DOWN IN THEIR COSY NEST IN THE WINTER

Of course, it is not a feathered mouse, but many of us call it that because of the way in which it runs and darts in and out of the hedges and bushes. It looks just like a field-mouse. It is the neatest, trimmest little bird we have, and, with its tiny beak and saucy little tail, it is just the bird that most of us would have created for a pet, if we could create a bird at all. As we have seen, this little wren of

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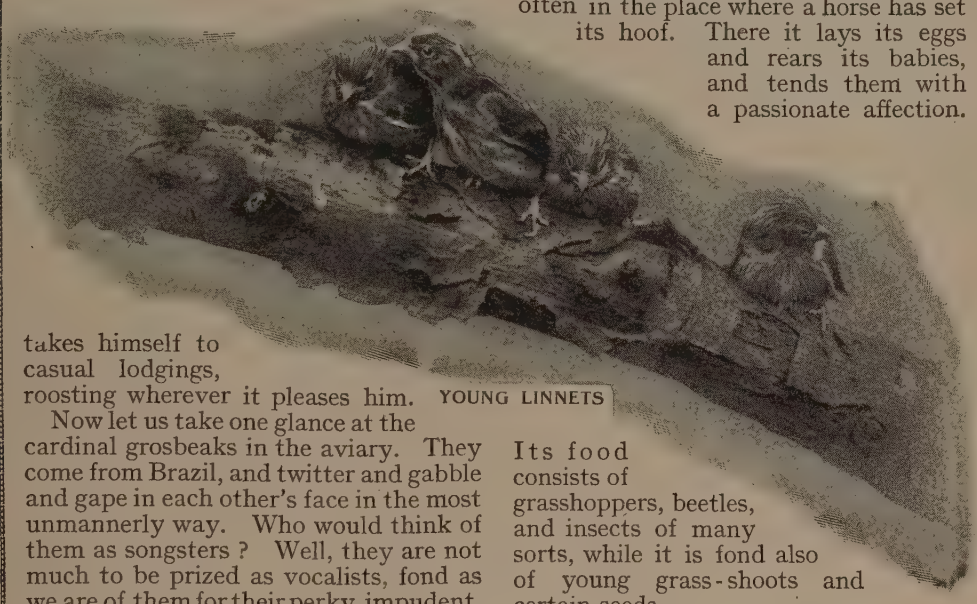
ours has a very remarkable cousin, the lyre-bird being in reality a wren. In the winter many wrens cuddle together for warmth in the same nest, and a very fine little nest it is, with a dome for dignity, and with strength fully equal to holding the many residents which winter demands make upon it. Very different is this bird from the robin, who will not have his fellows near him after certain periods of the year. He gives up his nest as soon as his babies are big enough to kick one another out, and then takes himself to casual lodgings, roosting wherever it pleases him.



YOUNG LINNETS

Its food consists of grasshoppers, beetles, and insects of many sorts, while it is fond also of young grass-shoots and certain seeds.

Now let us take one glance at the cardinal grosbeaks in the aviary. They come from Brazil, and twitter and gabble and gape in each other's face in the most unmannerly way. Who would think of them as songsters? Well, they are not much to be prized as vocalists, fond as we are of them for their perky, impudent, inquisitive ways. But they are to be respected for their grand relations, the other cardinal grosbeaks, called the Virginian nightingales. These can sing, and their scarlet feathers form a stately garb for birds so accomplished.

One of the most celebrated of our songsters brings up the rear of the procession. It is the skylark, the bird which has inspired some of the finest poetry ever written. It is a shameful thing to those who love birds that thousands of people never see a lark except in a poultry-dealer's shop. The flesh of the lark is not nice to eat, but it is the fashion among a certain class of people to eat it. Towards the end of the year larks assemble in great flocks near their summer haunts. The old birds and the birds born during the summer are joined by thousands of larks from over the sea, which have come here for the winter, and men make a living by trapping them to sell for the food of men who care not for the beauty of a bird's song or shape, but greatly rejoice over something to eat which other people cannot, or would not, have.

The lark soars so high that we do not always remember that it is a good seven inches in length, including the tail. The funny thing is that, while it flies higher than any other songster, its home and food are on the ground. The nest is made in some hollow in a field, often in the place where a horse has set its hoof. There it lays its eggs and rears its babies, and tends them with a passionate affection.

It is not the earliest riser, although we say "up with the lark." To tell the truth, the pet doves seem to be the earliest to wake. They start crooning before the day has come. They are quickly followed by the thrushes and blackbirds, but the lark gets up when the sun has somewhat aired the world. When he does rise, he rises indeed. We do not know where he is. From somewhere near heaven's gate, as it seems, there floats down to us a glorious melody as from some wonderful spirit bird. We look upward, and away up in the sunlit clouds we dimly see a speck. It is the lark, thrilling the beautiful air with the magic of that song which has so often echoed and re-echoed in the heart and brain of the poet.

The next stories of Birds begin on 2209.

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LOUIS IX. OF FRANCE ON HIS THRONE

Louis IX., usually spoken of as Saint Louis, was one of the best kings who ever ruled France. He made good laws which show remarkable humanity for the time in which he lived, and he established a court of justice in Paris, where he was not afraid to try the rich and powerful nobles who oppressed the poor peasants by making them work for little or no pay. He also founded hospitals and a great college. He was the highest type of ruler in the world at the time he lived. He was a devout Roman Catholic, but is no less admired by Protestants.

Looking out from the English Embassy on the Terror of St. Bartholomew's Day in Paris

THE BEGINNINGS OF FRANCE

CONTINUED FROM 1880

As the English boy looks over from Kent towards the shadowy cliffs that are the edge of the great Continent of Europe beyond, it is hard to realise that once upon a time there was no channel of ever-restless, dancing waves to part his corner of it from his nearest neighbour, France. But so it was in the times of the "very beginnings," for the same sorts of tools, the same sorts of bones are found north and south of the Channel. The wild men who made and used the tools, the wilder animals whose skeletons have been dug up and put together again, must have roamed freely over the lands that were then united.

Then, ages after the great western ocean had thrust long arms over the sinking land, and separated the country we now call Great Britain, Ireland, and France, another race of men spread over the now divided countries, and raised great stone monuments such as we may see to this day at Stonehenge in Wiltshire, at Carnac in Brittany. As we come nearer to the dawn, we find that still the dwellers on the south are very much like those on the north of the separating waters, with their Druid priests and mistletoe boughs, and tools of bronze. It was the great Cæsar himself who started the written history of the Gauls, as he called the people whom he found in the country now known as France. It was the success that he had in subduing them that made him anxious to push across the Channel to the white cliffs of their British cousins. As time went on, Roman civilisation spread in Gaul even more than it did in Britain, and many are the remains of villas, temples, and theatres scattered over the country which the soldier nation held for centuries. By means, too, of the fine roads—like the great Watling Street—traders passed right through the country, from the Mediterranean to the Channel, and then across to the "island in the mist" beyond.

Yet more the Romans did for Gaul; for when they could no longer hold the country, they left behind them a lasting influence on its speech, laws, customs, and religion. The Romans, after bitter persecution at first, had supported Christianity so strongly

in Gaul that it was never wiped out again as was the case in Saxon England.

Tribes of the same German family as the Angles and Saxons, who conquered Britain about the fifth century, gradually pressed into Gaul across the Rhine, and also into the Rhone Valley, and they managed to get more and more of the Gaulish lands for themselves.

How Clovis set up a kingdom of free men and called it France

One tribe proudly called themselves the Free Men, or Franks, and in the end their chief, Clovis, gained the country north of the River Loire, and called it Francia. He made his capital on a little island in the Seine, where already there had been a settlement. That little island is now the heart of the beautiful city of Paris, and on it stands the Cathedral of Notre Dame. Clovis married a Christian wife, who persuaded him to give up his old heathen religion.

What a wonderful scene it must have been, as Clovis and some 3,000 of his stalwart, long-haired warriors gathered round the saintly old Bishop Remigius, who baptised them on Christmas Day, 496, saying: "Adore what you have burnt, and burn what you have adored."

Wild and bad times came after his death, full of enthralling stories of wicked queens and good bishops, strong soldiers and weak kings. The monasteries, as in the early troubled times in England, were the centres of peace. Scholars assembled in them to learn and study and to pray, and to write precious manuscripts, such as we can see now in the British Museum, which were then the only books.

The coming of Charles the Great, the hero-king of France

After a long line of "do-nothing" kings a strong man rose up to withstand a great invading army of fierce Saracens, men who were followers of the Prophet Mahomet, and were the destroyers of civilisation and Christianity. At the great battle of Tours, which saved Europe from bondage, Charles, the leader of the Franks, beat about with his heavy battle-hammer all through a long autumn day, till his men thought of the old god Thor of their ancestors, and called him Charles Martel, Charles of the Hammer. His grandson, Charlemagne, or Charles the Great, is one of the heroes of France, as Alfred the Great is of England. Like Alfred, he cared much to make good laws and govern his kingdom well, and to encourage people to learn and study. A thoughtful and good monk, Alcuin, came over from England to help him. He did much to improve trade, and by establishing fairs brought people together, and so helped them to know each other, and overcome foolish dislikes and prejudices.

Egbert, often called the first King of England, stayed for some time at the Court of Charlemagne, and learned much that helped him to bring the rest of the small kingdoms under his leadership when the time came. For Charlemagne's great ambition was to rule over a great dominion, and all his life he was busy drawing together the different states in the country, conquering wild tribes beyond his borders, doing battle with the Moors in Spain, and, in the end, he more than doubled the kingdom he had inherited.

Why the tears came in the king's eyes as he looked from his window

Part of his army, under his friend Roland, was attacked and overwhelmed when passing through a valley in the Pyrenees on their way back from the war in Spain, and this formed the subject of a great poem, "The Song of Roland," which was sung and recited all over the west of Europe for centuries. When Taillefer, the minstrel, about 250 years later, led the Normans to the battle of Hastings, which we read about on page 591, his song, taken up by the whole army, was about the valour of Charlemagne's knights in this song of Roland.

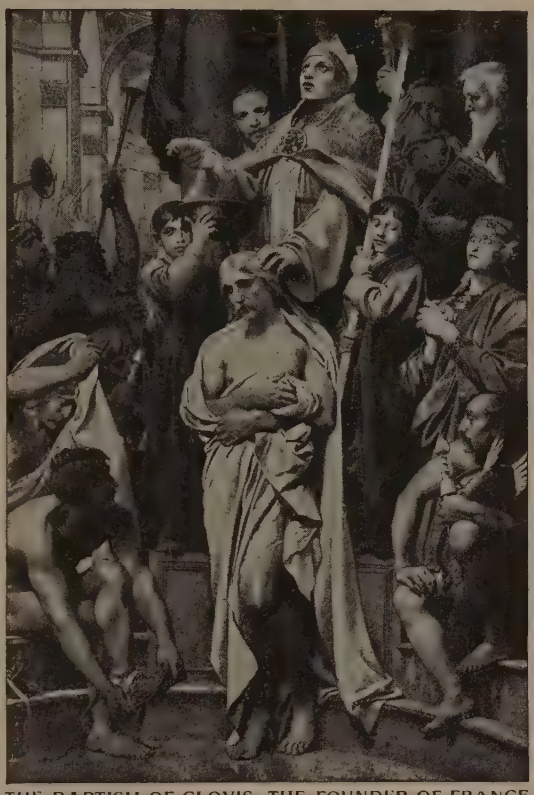
There is a story told of Charlemagne looking out from his window on the Mediterranean and seeing the boats of the Northmen on the blue sea. They had come all the way from Denmark, and other northern countries. We read on page 431 how they were dreaded in England, and how they ravaged and burnt on all the coasts. Charlemagne's eyes, we are told, were filled with tears as he watched the long, swift boats, and said to those about him: "I do not fear them for myself, but woe to those who come after me."

A hundred years later what the great Charles had dreaded came to pass. His empire was divided up,

and in the reigns of his weak descendants—the Meek, the Fat, the Simple, the Fool are some of their nicknames — the dauntless Northern pirates and rovers pushed up the Seine and the Loire, plundering first and then returning to settle. Charles the Simple followed the example of Alfred by giving them part of his kingdom, so that the rest might be left in peace.

In Rouen, the old capital of Normandy, there stands a statue of Rollo, the first of the Norman dukes. He stands proudly pointing to the soil, and the words that are written on the base are "J'y suis, j'y reste," which mean "I am here, I stay here." There is a story told of him when he had to do homage to Charles the Simple for his newly-gained lands. It was his part to kneel before the king and kiss his foot.

"Never will I bend my knee to anyone nor kiss his foot," cried Duke Rollo, with blazing eyes. At last he was persuaded to let one of his warriors do homage for him. The Northman



THE BAPTISM OF CLOVIS, THE FOUNDER OF FRANCE

CLOVIS II., THE BOY KING, RECEIVING THE HOMAGE OF THE CHIEF RULERS OF HIS TRIBE

Clovis was the chief of one of the heathen German tribes of Franks, or Free Men, who settled in Gaul, as France was then called. He founded his capital on a little island in the Seine on which the beautiful cathedral of Notre Dame now stands in the centre of Paris. Clovis married a Christian who persuaded him to embrace her faith. In the top picture we see him being baptised by the saintly Bishop Remigius on Christmas Day, A.D. 496. In the bottom picture, by Albert Maignan, we see Clovis II., who became king at the age of five. He ruled over 100 years after Clovis I., and before he died became king of all the Frankish tribes who had settled in France.

This picture is reproduced by permission of Messrs. Braun, Clement & Co.

seized Charles's foot so roughly that the poor king fell over backwards, amid the loud laughter of those standing by.

As soon as the Northmen entered into quiet possession of the pleasant and rich country now called after them —Normandy—they settled down to cultivating it, became Christians, built churches and cities, and before long spoke the tongue that had become the language of most of the country from the time of Charlemagne—French, founded on the Latin of the old Romans.

THE FIRST FRENCH KING OF FRANCE, WHOSE HOUSE RULED 800 YEARS

Charlemagne himself spoke a German language, but he had to learn French, and the oldest written document in it is the oath taken by his grandson in the treaty which marks the beginning of the three great kingdoms of Italy, Germany, and France.

We have seen in the story of Great Britain how William, Duke of Normandy, only six generations after his forefathers had settled on the south side of the Channel, determined to add England, on the north of it, to his possessions. We have seen, too, how he did it, and how England in consequence became mixed up with the quarrels and wars of the Continent through having kings who were also dukes of Normandy, and also what troubles arose later by English kings marrying French princesses, who brought large provinces in France as their marriage portions.

It was not, however, till the end of the tenth century that it could be said, "France has a French king." Hugh Capet, Count of Paris, was then chosen king by the great nobles who ruled over the various independent provinces acknowledging the king as overlord, and his descendants ruled France for eight hundred years.

THE FIGHTINGS OF THE FEUDAL LORDS, AND THE SORROWS OF THE POOR

Hugh's royal dominions were only a twentieth part of what is now France, and for many centuries the powerful feudal lords were constantly rebelling against the Crown or fighting each other. This state of things made it very wretched for the poor, who were serfs, bound to work on the soil or fight for their masters. There were often terrible famines in those days, and sore was the want and oppression that prevailed all over the land.

One can fancy some of these poor creatures hanging on the edge of the excited crowd, listening to the eloquent preaching of the French monk who had returned from the Holy Land with sad tales of Jerusalem in the hands of the Mahomedans. When he urged his hearers to go and fight them, the tears rolled down their faces, and they shouted again and again: "Dieu le veut," which means "God wills it." As we have read on another page, this enthusiasm spread to England, and princes and knights, even the lion-hearted king himself, and thousands of English workers badly needed at home, took part in the Crusades to take Jerusalem from the Turks.

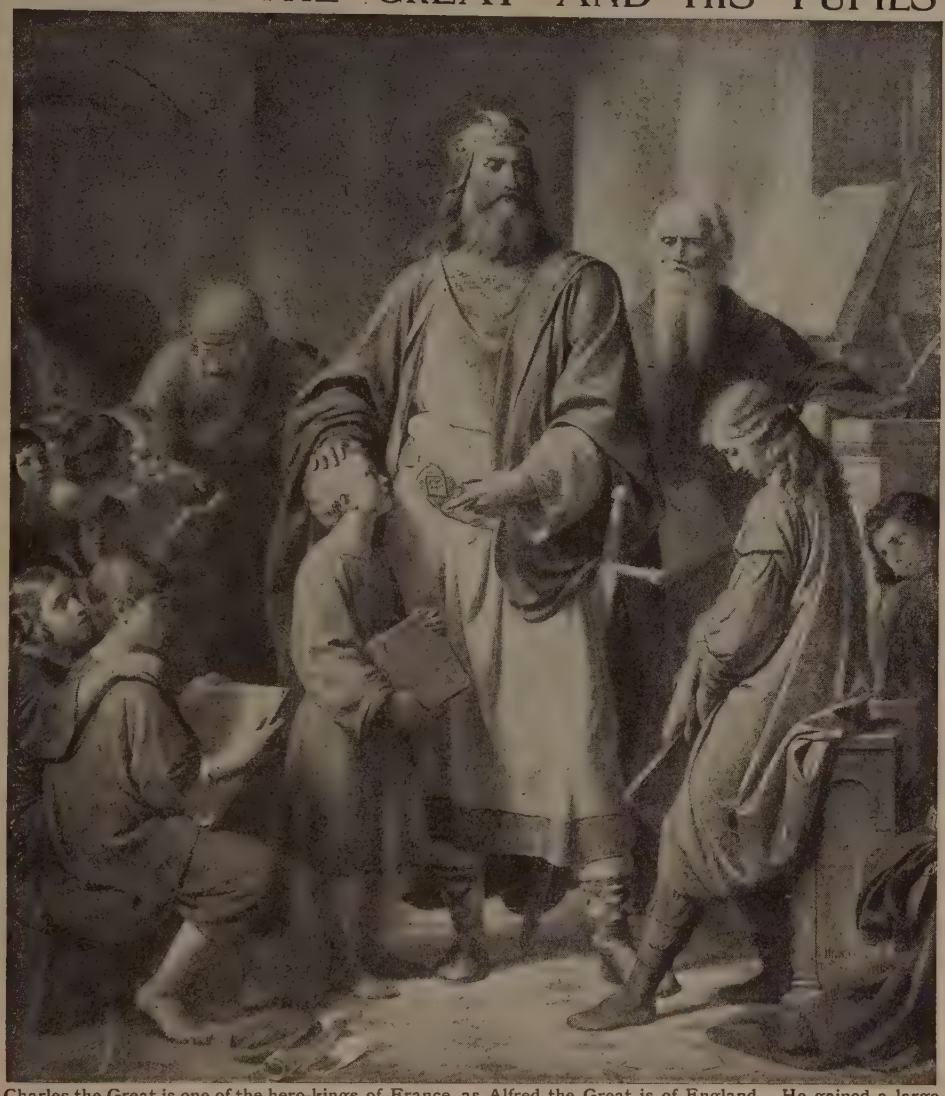
One of the best of the French kings, Louis IX., whom we read of on page 1591, went twice to the Crusades. He made good laws, and founded hospitals and a great college, and established a court of justice at Paris, where the rich and powerful could be called to account for wrong-doing.

HOW THE BARONS SOLD FREEDOM TO GET MONEY TO SET JERUSALEM FREE

These rich and powerful nobles tyrannised terribly, not only over the poor country folk, but over the people who were better off in towns; for the towns, too, belonged to them, and they could make the citizens grind their corn and bake their bread just where they chose, and make them pay just what they chose for having it done; yet they gave them no voice in electing their own magistrates or settling the laws and taxes, and no freedom in trade.

Now, one of the good results of the Crusades was that in France they hastened the freedom of the cities, for often the barons who owned them wanted money so badly to go to the war that they had to sell to the citizens the rights they so much desired. Sometimes the king would help the citizens against the nobles in the struggle that went on and on through the centuries.

Many of the earlier kings of the House of Capet were weak, at a time when the Norman kings of England were great and powerful, as we learned on page 591, so they were able to hold a large part of France. But when the strong Philip Augustus determined to increase his power, John the Coward



Charles the Great is one of the hero-kings of France, as Alfred the Great is of England. He gained a large dominion; but, more than all that, he encouraged people to study, having pupils of his own, as we see in this picture.

was not the man to withstand him. By degrees Philip conquered Normandy and many other lands held by John in France. Indeed, it almost seemed as if Philip would gain England too.

Some years after the English patriot, Simon de Montfort, of Norman birth, began to take the first difficult steps towards forming a House of Commons, where the people could be represented, the King of France called a National Assembly to meet in the Cathedral of Notre Dame, in Paris. To this were bidden not only the nobles and clergy, but, for the first time, the representatives of the citizens. But these members never got so much power as the English Commons, and the French kings only called the "States General" thirteen times in 500 years. Absolute power was slowly and surely gathered more and more into one hand as the years rolled on.

We have seen on page 750 that it was wretched enough for England, during the long Hundred Years' War with France, to have thousands of her strong

men sent overseas to be killed, or to die of disease, or to come back ruffians, hardened to killing and stealing. But for poor France, where all the battles were fought, where towns were besieged and plundered, where the country was laid waste and provisions and treasures stolen, it was indeed terrible, and we can realise how widespread was the misery as we think again, looking at the map, about the "thunder of God" at Cressy, the "snowstorm of white arrows" at Poictiers, the tears of the gentle queen at Calais, the fine Court of the Black Prince at Bordeaux. There is an old song still sung about the pleasant fields and orchards of Normandy, of which the chorus runs: "Jamais, jamais, jamais, les Anglais ne régneront sur nous," meaning, "Never, never, never shall the English reign over us." It dates from these wars when Edward III. tried to become King of France, and, indeed, called himself so, and added the white lilies of France to his coat of arms.

THE ENGLISH IN FRANCE, AND THE SAD STORY OF JOAN OF ARC

In a later chapter of this sad war comes the romantic story of the successes of King Henry V., owing to the disunion of France and the madness of her king. Henry regained much of the French land that had been lost, but, even if he had lived, he could not have kept the throne, which had only been offered to him by the nobles in a fit of passion against the Dauphin, the true heir to the kingdom. We read on page 754 how Henry died at Paris, and was buried at Westminster.

In the disturbed times that followed his death, when the fortunes of France were at their lowest ebb, owing to the weakness of the Dauphin, afterwards Charles VII., there stands out the wonderful story of Joan of Arc, which we read on pages 754 and 121. She was so persuaded herself that God called her to deliver her country that she succeeded in persuading others too; and we see the simple peasant girl, transformed into a leader of rough soldiers, on her white horse, with a white banner in her hand, so inspiring them with her enthusiasm and goodness that their courage revived, victory followed victory, and the French king was crowned triumphantly at Rheims, Joan, with her banner, standing by. It was a black and shameful day when Joan was burnt by the English as a witch at Rouen, after the French and their ally had given her up to them. She had saved France, but its king held out no hand to save her from her cruel enemies.

THE NEW WEALTH AND THE NEW IDEAS THAT CAME TO FRANCE AND EUROPE

At the Field of the Cloth of Gold, which we read about on page 840. the host of the brilliant party was Francis I., the first French king who ruled over the country from sea to sea, united under the royal power. The long wars against a common foe had made men act and suffer together. Formerly each baron had lived apart in his own strong castle; now Francis I. gathered them to his Court, and all sorts of extravagance and gaiety became the custom wherever the Court was held.

France came in for her share in the great fortune that fell about this time to the old European world. Gold and silver to make coins could be had in plenty, trade began to flourish, new thoughts and ideas rose in men's minds as the New World and the new learning came in sight.

The new religion did not take hold of the mass of the people as in England. In spite of long and bitter disputes with the Pope during the Hundred Years' War, the greater part of the people remained firm Roman Catholics. Protestants were called Huguenots, and were bitterly persecuted from the first. Calais, the only possession in France left to the English at the end of the Hundred Years' War, was taken by the French during the reign of Henry II., the son of Francis I.

THE WICKED MOTHER OF 3 KINGS, AND THE TERROR OF ST. BARTHOLOMEW'S DAY

Catherine de Medici, the wife of Francis I., was a very clever but wicked woman, the mother of three kings of France whose reigns dwindled miserably away, the result of their bad and idle lives.

The eldest, Francis II., was the husband of the beautiful and unhappy Scotch princess, Mary Stuart. We know how sadly she left her beloved France after her young husband's death (we can see the picture on page 847), and what a miserable life was hers as Queen of

Louis XI. was in some ways a good King of France. When he came to the throne his country was almost ruined by the Hundred Years War. He strove to find out everything about his subjects, rich and poor. He was so earnest about this that he used to go alone and visit his peasants in their homes, as we see in this picture by Mr. J. Seymour Lucas, R.A., given here by his permission.

This picture shows how gentle and thoughtful for his poor peasant subjects Louis XVI., who was guillotined in the Revolution, could be. He was very unfortunate in coming to the throne when he did, as his grandfather, Louis XV., had ruled very badly and had taxed the poor terribly. For the first two years of his reign Louis XVI. tried to carry out reforms, but a big war with England, and the influence of his queen, Marie Antoinette, rendered his efforts at reform useless, and the French Revolution broke out.

Scots! Francis II. was followed by his brother, Charles IX. In his reign was the terrible massacre of St. Bartholomew's Day, when the Huguenots were suddenly murdered, it is said, to the number of 2,000 in Paris, and 20,000 in France altogether. It was Catherine who planned this dreadful deed. The houses of the Huguenots were marked with a white cross, and the Roman Catholics put a white cross on their hats and tied a handkerchief round their arms, so that they might know one another when the bell began to toll for the massacre to begin. This was in August, 1572. This sixteenth century was full of cruel persecutions in the name of religion both in England and France, and in the latter country were also years of wretched civil wars on the same account.

It is a relief to turn to Henry IV., called the Good, the friend of Queen Elizabeth and the hero of the battle of Ivry. He had sympathy with the poor, having been brought up in the country in a simple way, among peasants.

A POPULAR KING, A FAMOUS CARDINAL, AND SOME VERY BAD WOMEN

One of Henry's best deeds was to allow liberty of worship to the Huguenots, by the Edict of Nantes. This was a whole century before England allowed real freedom to those who differed from the established religion of the land. Henry was brought up a Huguenot, but turned Roman Catholic after he became king. "Paris is well worth a mass," he said in joke to his friends.

His wife, Marie de Medici, was not a good woman. Their daughter, Henrietta Maria, married Charles I., and her bad upbringing caused much unhappiness in England, especially when her mother came to stay with her. Henry had a clever adviser, Sully, and with his help got the money affairs of the kingdom into order; they also made roads and canals, and encouraged manufactures and commerce, and France was very sad when he was killed by a madman in the streets of Paris.

A great Minister, Cardinal Richelieu, did a great deal for France in the years that followed. He protected commerce and tried to keep order among the nobles, destroying their castles, reforming the government in the provinces, and taking away some of the old powers of the nobles and giving them to the Crown. He did all he could to ruin the Huguenot party, and did his best to increase the dominions of France and lessen the power of Spain.

THE AGE OF GRANDEUR, AND THE PALACE WITH 4,000 SERVANTS AND 5,000 HORSES

After him came the "age" of Louis XIV. This king reigned over seventy years, and during his long lifetime he would have seen, if he could have cast his eyes across the Channel, the most stirring times of the Stuarts, the execution of Charles I., the Commonwealth, the Restoration, and following sovereigns down to George I. In the struggle of the people against the tyranny of the Stuarts, Louis XIV. ever took the side of the kings, and when James II. had to flee the country, Louis helped him with money and soldiers, and at last gave him a home till he died.

Many learned men and great poets lived in this age, and as French was much spoken all over Europe, their works were widely read, and made people think and study. It was an age, too, when France spread beyond her own borders across the ocean, where years before bold Breton fishermen had crossed and started the great trade in cod. Now devoted Jesuit missionaries followed Cartier and other explorers, not only on the St. Lawrence and great lakes, but down the length of the Mississippi, naming Louisiana, at its mouth, after the king, as we read on page 1246.

It was an age, too, of great works at home—roads, canals, and buildings. It took twenty years to build the huge palace of Versailles and to turn the barren lands about it into a splendid park, by planting thousands of trees and bringing water by canal from a distance to form lakes and streams and waterfalls. It sounds like a fairy tale to read of the 4,000 servants, 5,000 horses, 10,000 soldiers of the guard.

THE GROWING VANITY OF VERSAILLES, AND THE GROWING MISERY OF THE POOR

Hundreds of courtiers all gathered about this town of a palace, where fêtes were held of extraordinary magnificence. What Francis I. had begun a hundred years before in forming a gay Court to live always about him, Louis XIV. carried on in the most lavish way. He made his Court the most splendid in the world, and insisted on his nobles leaving

A STORY OF A TERRIBLE DAY IN FRANCE

This picture, one of the most expressive ever painted by Sir J. E. Millais, tells a story of the terrible eve of St. Bartholomew, 1572. It is called "Mercy," and represents a good nun beseeching a Catholic not to obey the summons of a monk beckoning to him to come out and massacre the Huguenots, who were the Protestants of France. The Catholics tied a white handkerchief round their arms and wore a cross on their hats to distinguish themselves from their victims, and all the houses of the Huguenots had been marked with a white cross. All night long the horrible slaughter lasted, and on through the next day, until 2,000 Huguenots in Paris had lost their lives. Following the example of Paris, the Catholics throughout France rose and massacred 20,000 of these poor people. The cruel Catherine de Medici planned this terrible massacre.

their estates in the country and living at Versailles, where they had nothing to do but stand around and watch the king at his toilet, or at his pleasures, and join in the dancing, play-acting, gambling, and hunting which filled up the time. In the meantime, the lot of the peasants on the estates grew worse and worse, and throughout France unjust taxes were wrung from the people to pay for the extravagances of Versailles.

This age of Louis XIV. was also celebrated for great generals, as well as for great writers, great expansion abroad, great luxury and want at home; for wars were constantly going on with Spain, Holland, and England. Often these great generals gained most brilliant victories, which set France for a time at the height of her glory. But towards the end of the long reign, Marlborough and his allies, as we saw on page 1029, stopped the increase of the power of France, which so alarmed the rest of Europe, by winning battle after battle. When the old king lay dying, his grand armies were destroyed, his fine ships were battered hulks, and treasures of precious lives and hardly-gained money had been poured out for naught.

This picture shows us how England was joined to France thousands of years ago, before the great western ocean spread itself over the land that now lies at the bottom of the North Sea and English Channel. Men and animals at that time wandered quite freely from England to France.

Many of the wars were about religion, for Louis hated Protestants, and treated the Huguenots with such cruelty that all who could escaped to other lands, to the great loss of France, for these God-fearing, industrious people carried away with them their skill in manufacturing, as we know in the history of our own silk and woollen trades.

Such was the state of misery to which the country was brought by famine and oppression that a great archbishop wrote to Louis: "The whole of France is one great hospital, a hospital without money." But the king only mocked; he cared not so long as he could get money for his wars and palaces, and he could not see that France was like a great gilded statue, with the wood inside all decayed. One of the sayings of Louis—the little man with high-heeled shoes and large wig—was this: "L'état c'est moi," meaning "I am the State"; and it expresses his ambition to be absolute master of everybody and everything.

When he died, lonely in the midst of state, the people waited, rejoicing and feasting, on the road to see the body of the grand monarch pass by to the royal tomb at St. Denis.

His great-grandson, who followed, cared for nothing but his own wicked pleasures, and during his long reign France lost Canada and her influence in India. Commerce was checked, and the state of the people was piteous indeed. Money was dragged from them for the king to spend in disgraceful luxury. He and a few nobles bought up all the grain in the kingdom, so that all must pay their exorbitant prices or starve. There was a gloomy dungeon prison in Paris then, the Bastille, and into it people were flung without trial or reason, men and women alike. The king used to sign orders for sending people there, and give or sell them to his favourites to fill in the name of anyone they wished to get out of the way. Many very clever men wrote at this time attacking all this cruel oppression of the people. Sometimes these books were burned, and the writers shut up in the Bastille; but their words sank into the hearts of those who read them, and the rumblings of the coming storm could be plainly heard.

The next story of France is on page 2267.

The Ice Age at the present day in Greenland

WILL THE ICE AGE COME AGAIN?

CONTINUED FROM 1993

THE answer to this question is probably "Yes," but it is one that is very much discussed by students of the earth, whom we call *geologists*, from the word "ge," which is Greek for the earth; and no one can be certain of the answer so long as we are not quite sure what was the cause of the Ice Age of the past.

There seems to be no doubt that there were at least two Ice Ages in the past, if not three. What we need is to find out why the northern half of the earth was so cold that the great ice-cap that now exists round the North Pole spread far down over Europe. Perhaps some change in the angle at which the earth is tilted towards the sun had something to do with this difference of climate; and it may very likely be that this change is one which slowly comes and goes, and comes and goes again, at very long intervals in the history of the earth. If that is so, we shall probably have an Ice Age again, not once, but many times over; and civilisation will be driven to the south. Also, there is bound to come an Ice Age at last, when the earth gets very cool; and then men will have to live mainly near the Equator, where the rays of the sun fall straight to the earth, and so keep it warm.

IF SNOW IS FROZEN RAIN, WHAT IS HAIL?

Both snow and hail are made of water, as we see when they melt. Snow, we know, is water which has frozen in the form of very beautiful, flaky crystals. These, of course, are ice-crystals, and if the water had not frozen it would have fallen as rain. But hail is also made of ice-crystals, or water-crystals, as we might equally well call them; and the difference between snow and hail is not a chemical difference at all—that is to say, not a difference of composition—but merely a difference in the way the crystals have formed as the water was frozen in the sky, and in the way in which the crystals cling to each other.

It seems to be probably a *very sudden* cooling of the air when it contains a great deal of water-vapour that causes the crystals to form as hail. That, perhaps, is why we commonly get hail in summer and snow in winter, as the air usually holds more water-vapour in summer, and may therefore get more suddenly cooled by a cold wind than it does when it is dry.

HOW CAN IT SNOW & RAIN TOGETHER?

This seems rather a puzzle, as both snow and rain are made of water, and water must be solid at one temperature and liquid at another. There can only be one explanation, and that is certainly the true one. The rain must have been formed at one temperature—that is, above the freezing-point of water, which is called 32 degrees on the thermometer scale, named after its inventor, Fahrenheit; and the snow

must have been formed at another temperature, below the freezing-point of water. This may quite easily happen, as the temperature of the air varies at different levels. In such a case as this, then, the snow and the rain have been formed at different levels differing in temperature, the one below and the other above the freezing-point of water; and the snow, in falling, has not had time to be warmed so much as to melt.

WHY DOES BLOTTING-PAPER ABSORB INK?

It is mainly a question of the surface of the paper. A very hard, very smoothly glazed paper will scarcely absorb any ink. If we write on such a paper, the ink takes a long time to dry; and what makes the writing is simply a layer of the solid matter left by the ink, that lies on the outside of the paper, and can almost be scraped away.

All other papers absorb ink to some extent. Ordinary paper, such as these words are printed on, absorbs a good deal. The drying of the ink means that the water of it has evaporated into the air, while the solids that were dissolved in it remain in or on the paper. But a paper of loose texture, with a rough, unfinished surface, like blotting-paper, absorbs ink just as a sponge sucks up water; and the water of the ink, instead of mainly remaining on the outside of the paper until it dries, runs into the substance of the paper, according to the amount of ink we use. That is why the letters are not sharply defined when we write on blotting-paper.

WHEN IT LIGHTENS AND THE SKY OPENS, WHY DOESN'T SOMETHING FALL OUT?

People who study words and sentences tell us to beware of what they call the "double question"—a question which has another question hidden in it, and the hidden question assumes what is not true. When it lightens the sky does seem to open, certainly. I remember well, said the Wise Man, seeing the sky seem to open during a storm when I was a child, and thought I saw the "great white throne" of which it speaks in the Bible. But this is only because the sky is usually dark during a storm, and the bright lightning makes us fancy that we are looking through the sky at something beyond. Summer lightning on a bright night does not give us this notion. The sky, then, does not open when it lightens, and so there is no reason why anything should fall out. The sky is not a solid thing that holds up something above it, but is really endless space. If there were no air, the sky would seem quite dark and deep all the time, except where we saw the sun or moon or stars; but the air reflects the blue part of the sun's light, and so makes us think we are looking at a great blue dome stretched over our heads.

WHY DO SOME PEOPLE GET BALD?

Probably the chief reason why some people get bald is that we do not trust our hair to do its natural work Hats interfere with the ventilation of the scalp, and the hair is poisoned, as plants would be if we kept them in a hot-house and never changed the air. All our clothing should really be loose enough to allow of free ventilation, and it should be made of something that allows the air to pass through it. That can be said of very few hats and caps. Another reason why hats injure the hair is that they fit tightly on to the head, and so squeeze the blood-vessels that carry to the scalp the blood by which the hair is nourished. A hat, by squeezing the arteries, starves the hair, and, by squeezing the veins, it interferes with the return of blood from the scalp, which gets filled with stale blood.

These are the reasons which mainly explain why so many civilised men get bald. Then, as the hat has destroyed the hair, we find that we *have* to use a hat to protect ourselves from the sun. The unnecessary hat destroys the hair, and so becomes necessary. Women do not get nearly so bald as men, and the reason probably is that their hats do not interfere so much with the ventilation of the scalp, and that they are attached to the hair instead of being jammed upon the head itself, so as to spoil the proper circulation of the blood through the scalp.

WHY SHOULD OUR CLOTHES BE LOOSE?

All our clothing, from head to feet, should be worn loose for several reasons. Tight clothing interferes with the movements of the body, and this is specially serious not merely for the man who wants to run a race, but for everyone, as we must all breathe. Anything

tight worn upon the trunk of the body interferes with the movements of deep, easy breathing, and injures our health. I hope no girl who reads this book is so foolish as to squeeze her waist by tight clothing, and so seriously injure her health and her future appearance. Tight clothing is bad also because it interferes with the proper circulation of the blood through the body.

Many foolish people suffer from cold feet because they wear boots so tight that sufficient blood to keep the feet warm is simply unable to get into them. Such people almost deserve to have cold feet, and corns and chilblains, and all the other unpleasant consequences of wearing too tight footgear. The proper way to keep warm is by our blood, not by cotton or leather, and the way to help the blood to do its work is to give it room to flow instead of tightening the veins and stopping it. Yet most of us are so anxious to look swell that, even if we learn the terrible price we have to pay, we go on doing foolish things all the time.

WHAT CAUSES CHILBLAINS?

I am afraid we all know what chilblains are, but most of us have no experience of frost-bite. Yet chilblains are really a very mild kind of frost-bite, which people who live in such a country as Canada have to beware of; and they are due to the same cause as frost-bite.

Cold is the beginning of it, but it is not merely the cold that does the harm; it is really *starvation*—starvation of a finger or a toe, or the nose, or the ear, because it is not supplied with enough blood; and the cold acts simply by shutting up the blood-vessels, so that the toe, or whatever it is, is starved. In what we call a chilblain, the toe or finger is by no means starved of blood. On the contrary, it is warm and red. But it *has been* starved, and now it has an extra supply of blood in it to make good the damage.

The surest way of getting chilblains is to wear very tight boots or gloves, to take no exercise, to get exposed to cold, and to keep hands and feet warm in cold weather by holding them before a fire, allowing them to get really cold before or after doing so. Children are specially liable to chilblains, because their tissues are delicate, and will not stand a little starvation, even for a short time, so well as the tissues of a grown-up person.

HOW DO STONES GET INSIDE FRUIT?

This question, and many like it, is answered if we watch what actually happens in Nature. We find, then, that what we call fruit, such as a cherry or a plum, is the last stage of a long series of changes that happen in the flower of the cherry-tree or the plum-tree. After these flowers have been fertilised—which means made fertile, or capable of producing something—they begin to change. If we look on, we may think that the flower is dying. The beautiful petals fall off, not because any harm has come to the flower, but because the petals are no longer wanted.

Then a little hard thing, with a tough skin, appears; and that is really the fruit. But at this stage it consists of hardly more than the stone and the skin covering it. But there is a layer of very active cells, which lie between the stone and the skin, and they produce the flesh of the fruit, for which we prize it. Birds prize it, too, and so they eat the fruit, and in so doing carry the stone away with them. If it is fortunate, it falls upon suitable ground, and begins to grow, or to *germinate*, as we say. The living interior of the stone, which contains the seed of the young plant, begins to grow and passes through the shell, and so a new tree begins to form. It was for this that the flowers were made.

WHO LIGHTED THE VOLCANOES?

A volcano, we know, is a great hollow mountain, and is named after Vulcan, the god who was supposed to deal with fire, because fire comes out of it. A volcano has a hole called a crater, and this hole seems to lead down into the hot inside of the earth; so that, instead of this question, we might almost as well ask, Who lighted the inside of the earth?

But the inside of the earth is always hot, yet volcanoes are by no means always in eruption, as we call it. It must be, then, that something happens which sets the volcano in activity; and the possible reason may be guessed, and if we remember that most of the great volcanoes, like Vesuvius, and Etna, and Hecla, are not far from the sea. It may be that the volcano

THE HEART OF THE GREAT COMMERCE OF THE BRITISH EMPIRE

This is a picture of the Thames, the great river running through London. Its ships bring from the ends of the earth the things that London needs. Here ships come from every country on the earth, carrying fragrant tea from India and a thousand other things. Black men, brown men, and white men work on these ships, loading and unloading from morning till night, and the babble of strange tongues never ends. This picture was painted by a great artist, Mr. George Vicat Cole. Mr. Gladstone said that the picture was so real that it seemed to speak to him, and to say, "You see here the summit of all the commerce of the world."

communicates with the inside of the earth where it lies under the sea.

Now, if there happened an earthquake under the sea, and the crust of the earth cracked there, great quantities of water would pass through into the hot interior of the earth, where they would be instantly turned into steam, or rather into water-vapour or gas. This gas is formed under great pressure, like the gas which is formed when we fire a gun. It must get out somewhere, and so it finds its way to the crater of the volcano and drives before it everything that is in its way.

WHY DOES THE AIR NEVER GET USED UP?

We may say that, in a sense, a great deal of the air has already been used up, for we know that by far the greater part of all the surface of the earth, including all the water of the seas, is already burnt, and so has used up a great deal of the oxygen of the air. That happened a long time ago, however, before there were any living creatures on the earth. The air is constantly being used now—or rather the oxygen of it is being used—in the breathing of all living creatures; while the nitrogen of the air is being used by certain microbes, and now also by men themselves, who use electricity for this purpose; and, thirdly, green plants use the carbonic acid of the air, upon which they feed.

Yet the air does not get used up as regards any of these gases. There must be a compensation of some kind going on, and there is. There is a compensation, as regards the oxygen, because green plants everywhere in the sunlight are giving off to the air a great deal of oxygen—perhaps enough to make up for what they take in by breathing, and probably enough to make up for what animals and men take in by breathing. As for the nitrogen that is used, we can easily show that that is compensated for, for when the animals and plants die their bodies are decomposed, and most of the nitrogen they contain, which they originally got from the air, is given back to the air. Lastly, the carbonic acid taken from the air by plants is compensated for by the carbonic acid which all living creatures give out to the air when they breathe.

WHEN A SEED IS PLANTED, IS THE WHOLE PLANT CONTAINED IN IT?

For many years before our own times this question was hotly discussed. There were two opinions. One group of thinkers declared that, if only we could see close enough, we should find a perfect tiny plant contained in the seed, and, for instance, a perfect tiny chicken in the egg. The other party of thinkers declared that this was not so; that nothing in the least like a plant or a chicken was contained in the seed or the egg. Then the microscope came and answered this question once for all.

In an egg there is nothing we can see in the least like a chicken, but a small plant can be seen with the naked eye in a bean or pea. Every living creature starts from a single cell, and these cells, seen under the microscope, are so like each other that we can hardly tell most of them apart. They must be really very different, but none of them has, at first, any structure which in the least suggests what kind of creature it will become.

It could not be that the whole stuff of the plant is contained in the seed. An oak weighs thousands of times as much as the acorn from which it sprang. By no possibility could the seed of any creature contain all the stuff that is in the creature when it is developed. All this stuff, except a tiny part, has been obtained by the growing creature for its food. That, of course, is why children, who have to grow, need far more food, in proportion to their size, than a full-grown person.

WHY IS IT THAT SOME TREES FLOWER AND OTHERS DO NOT?

The flowers of different trees differ widely in their size and their prominence, so that, while we all know the flower of the horse-chestnut, we may never have noticed that the oak has a flower. Yet, if we could trace back the history of every acorn, we should soon find that the oak has a flower. The size and appearance of what we call a flower usually depend almost wholly upon a particular part of the flower which we call the petals.

Thus all that we notice of a rose is petals. But these are not necessary parts of a flower at all; and there are many flowers which have no petals, and are therefore not at all noticeable, especially when they are the flowers of large trees, and hidden among large leaves. All trees without exception have flowers; they may be large or small, but they always exist, and new

trees could not be formed at all without them, for the flowers bear the seed in which the new tree begins its own life.

The whole world of plants may be divided into two great groups—those which bear flowers and reproduce themselves by them, and those which have no flowers, and reproduce themselves in other ways. The flowering plants are much the highest in the scale, and they are certainly the latest to have evolved upon the earth. The finest and most wonderful of all the flowering plants are the trees. But a fern, for instance, belongs to a much older type than any tree, and bears no flowers.

DOES THE ORDINARY LAWN GRASS HAVE A FLOWER?

It is very likely that we have never noticed the tiny flower of lawn grass, yet certainly it has a flower, and grass could not continue without it. All the great company of grasses are included in the upper group of plants which we call flowering plants. The grasses constitute one of the "natural orders," as they are called, into which plants are divided; and they are of more importance than any other. For these include not merely the lawn grass and ornamental grasses in general, but also what we call the cereals, such as wheat, oats, barley, maize, and others. These furnish the great basis of the food supply of mankind; and if the grasses were to disappear from the earth, or if they were to lose their flowers, so that in a year they all died out, by far the greater number of all the human beings, and of many of the lower animals which the earth can now nourish, would die of starvation.

WHY IS BREAD CALLED THE STAFF OF LIFE?

Bread has long been called "the staff of life" because it was thought to be the most valuable of all foods for human beings. We have now proved that this opinion is perfectly true, and that bread is really entitled to this name. Of course, bread can be made of various cereals—all of which are kinds of grass—but the bread to which the name refers is wheaten bread. This particular grass—wheat—yields the best and the cheapest of all foods. It is *the* food of the Western world; and if the supply of it should fail we should have to live on rice, which is *the* food of the Eastern world, and which we know to be very much inferior to wheat in its power of sustaining human life.

The supply of this "staff of life" is now falling decidedly short of the need for it, and this is one of the great world-problems of the future. The time will probably come when, for sheer hunger, we shall have to stop growing other cereals to make alcohol out of, and to grow wheat instead. At the present time so many people could not live in Europe, and notably in England, without wheat from America; but the quantity of this that America can spare is decreasing every year, and may stop altogether in less than twenty years. It is possible to grow wheat on vast areas of Europe and Asia where it is not done; and it is also possible to make a wheatfield produce far more wheat, and therefore more bread, than it does now.

IF ALL THINGS BORN WERE TO LIVE, COULD OUR WORLD SUSTAIN THEM?

The answer is certainly "No." The average number of fishes in the sea is generally the same, yet one female fish may produce a million eggs—of which only one or two will live. A single microbe, if there were food enough, would multiply into millions in a few hours. Rabbits introduced into a country like Australia, where there happens to be a lot of food for them, become a pest in a few years. Every kind of plant and animal, high or low, tends to multiply far too rapidly. And when we look closely at the facts we find that the very reason why practically everything that is born does not live is simply that the earth cannot sustain them all. The struggle for life that goes on without ceasing among all creatures is a struggle for the food supply; and there is always a much smaller food supply than is needed for the quantity of young life that is always competing for it.

We may wonder that Nature should bring so many more mouths into the world than she is able to feed. I think we are beginning to see that there are good reasons for this terrible waste, as it seems to be; but, at any rate among human beings a much larger proportion of young creatures find room and food on the earth than among any other kind of living beings.

"LITTLE OLD MEN" OF THE GARDEN

TWO HUNDRED AND FIFTY YEARS OLD

MORE THAN EIGHTY YEARS OLD

ONE HUNDRED AND THIRTY YEARS OLD

MORE THAN SIXTY YEARS OLD

Though the Japanese do not like to be thougnt a little people, we have here a good proof that they have a great liking for little things. Trees like these have been cultivated and kept as small as shrubs by Japanese gardeners for hundreds of years. The seeds of these trees would grow into big trees if allowed to grow freely, but the gardeners keep back nature, as it were, by giving the trees very little light and water, and confining the roots in small pots. Even now, if these trees were planted in the ordinary way, they would begin to grow into big trees.

WHY ARE NOT THE STARS ROUND LIKE THE SUN AND MOON?

The reason why the stars do not look round is simply that they are so far away. The planets are far smaller than the stars, but they are so near that when we look at them through a telescope we can easily see that they are round. They have a *disc*, as we call it. But however powerful the telescope through which we look at the brightest or nearest stars, we never see even the smallest disc, but only a *point* of light. Though the star that shines as a point through the largest telescope may be a million times larger than a little planet like Venus or Mars, which shows a disc through even a small glass, it is so far away that its disc cannot be seen, and it seems probable that no improvement in the telescope, and no increase of its size, will ever enable us to see the disc of a star. But we have no doubt that the stars *are* really round like the sun.

WHAT ARE SATURN'S RINGS MADE OF?

This question has deeply interested astronomers ever since the telescope was invented and Saturn's rings were first seen through it. The various rings, some dark and some light, look, through the telescope, as if they were made of something quite solid and without breaks, like a wedding-ring.

A great Scottish student of Nature proved that these rings could not possibly consist of solid matter without breaks, for such rings could not be formed, and would be bound to break up if they were formed. But rings that would endure as Saturn's rings do might be made up of a great number of small parts—like pebbles, for instance; and that is, at present, the best answer we can give to this question. We really do not know very much about the rings, and, indeed, the only thing we can be really certain of is that they are not continuous.

Nor do we know why they should appear dark and light. Lately it was thought that some changes could be noticed in the rings, but that is not certain. We know that the stuff of which the rings are made must be revolving round Saturn at a great speed, for otherwise they would be drawn into the planet by its gravitation, just as the moon would be drawn into the earth if it stopped moving, or the earth into the sun.

IS THERE ANY LIFE ON SATURN?

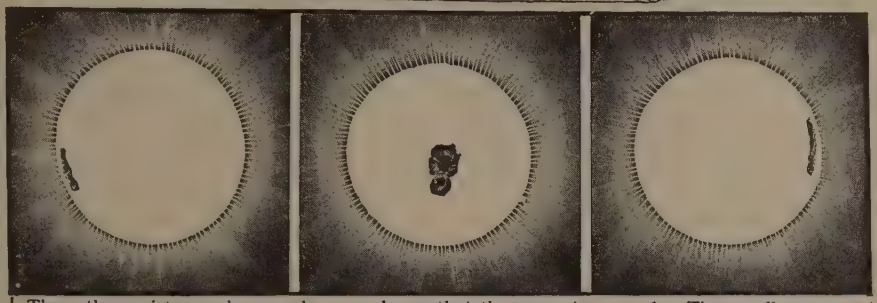
Saturn is so far away that, in spite of its size, we cannot learn very much about it; and this question can hardly be answered. Probably Saturn is still so hot that there is no life upon it yet. The planet is very big, and big things take longer to get cool than little things.

We can say, however, that, if we could live on Saturn, we should find our sky very wonderful. It is true that the sun would look much smaller than he does to us, and would be not nearly so bright, for Saturn is further from the sun than we are; also we should miss the earth's moon from our sky if we lived on Saturn. But there would be much to make up for these losses. In place of the one moon that the earth has, we should find no less than nine in our sky, for that is the number of known moons that Saturn has, and there may be more. But even these nine moons would not be the most interesting and beautiful things in the sky as seen from Saturn, for the rings would surpass them far in beauty; and, indeed, we cannot begin to imagine what the sky would look like if the earth had rings like Saturn, or even only one of them.

WHAT IS THE USE OF OUR HAIR?

We do not have hair like the hairy, or even furry, creatures. Hair is a special outgrowth of the skin, and is a distinguishing mark of all the creatures called mammals, of which we are the latest and greatest. Fish have scales, birds have feathers, and mammals have hair. Fur is a special kind of hair. We are very much less hairy than our ancient ancestors. Man has given up, almost altogether, the use of things like hair and claws for fighting or defence, and has come to live by his mind. Still, we have a little hair left, and it is quite useful; besides which, it is often beautiful. We find it almost entirely confined in ourselves to our heads, and its chief use is to protect them from the sun. It is a great pity that we do not trust it more for this purpose. Instead of that, we wear hats, so that after a time we can scarcely do without them, but are apt to get colds or sunstroke if we leave them off.

The next Questions are on page 2227.



These three pictures show us how we know that the sun spins round. The small spot on the sun is seen one day as in the first picture; after six days more it is seen as in the second picture (where it is enlarged for clearness); and in six days more it is seen on the other side as in the third picture. As the spot does not move, we know that it must be the sun that moves.

THE WONDER OF THE SUN

CONTINUED FROM 1949

We must, of course, begin our study of the heavenly bodies with the sun. He is by far the most important of them all for us, as the source of the earth's life and beauty, and changes that occur in the sun affect the conditions of the air we breathe. In studying the sun we are studying the only one of the stars which we can know at all closely, and we are thus helped to guess something of the nature of the other stars.

We are to think of the sun, then, as a great glowing ball which ceaselessly sends forth, day and night, in every direction, enormous streams of light and heat, and has been doing this for countless ages. We know how powerful the sun's heat and light are in so far as the earth catches them; but it is right to remember that all the light and heat that fall upon the earth from the sun are a mere nothing compared with the total amount which the sun is always giving out.

As we know the size of the earth and its distance from the sun, we can calculate that the amount of the sun's light and heat which fall upon the earth is less than one two thousand millionth part of the whole. Yet this trivial fraction of the sun's whole light and heat makes all the difference between an earth on which no life could be and the earth we know, filled with life and beauty on every side. As has been well said: "For the power to live and move, for the plenty with which we are surrounded, for the beauty with which Nature is adorned, we are immediately indebted to one body in the countless hosts of space, and that body is the sun." We can get some idea of the sun's power by remembering that if there were 2,000,000,000 earths dependent for all these benefits upon the sun, he would be able to satisfy them all. The sun could give to every man, woman, and child in the world the same heat as he gives to the whole earth, and yet have left enough for hundreds of millions more.

We know that the earth, compared with our own small bodies, is large. The distance of a line drawn right through it from one side to the other and passing through its centre is about 8,000 miles. This line is called the diameter, which really means the *measure across*. Now, the diameter of the sun is about 865,000 miles. The sun is very nearly round, like a round ball, and in order to find the distance right round a ball, when we know its diameter, we have to multiply the diameter by about three and one-seventh. If you do this, you will find for yourself what is the circumference of the sun, or the distance right round it. The 25,000 miles of the earth's circumference is hardly any distance at all compared with the circumference of the sun, and it has been calculated that a train travelling sixty miles an hour would have to travel without

stopping for five years before it went right round the sun. We shall see in a little while that the sun spins round on itself as the earth does, and though it takes much longer to spin right round once than the earth does, yet its size is so enormous that the real movement of any part of its surface must be very quick.

THE SUN IS BIGGER THAN A MILLION EARTHS LIKE OURS

We can get some further idea of the size of the sun when we learn that if it were cut up into a million parts of equal size, each of these would be bigger than the earth. They would not, however, be as heavy as the earth, for the sun, as we shall see, is much less dense than the earth. The mass of the sun, as compared with the mass of the earth, is not a million times as great, but about three hundred thousand times as great. The earth, then, we see plainly, has shrunk much more than the sun has, and the matter in it is more tightly packed. The earth is denser because a great part of the matter of the earth has condensed into liquids and solids, but the hot sun consists of a mass of gas, and though that gas must be very tightly packed in the inside of the sun, yet an average piece of the sun, so to speak, would contain much less matter in it than an average piece of the earth.

On a bright, clear day we say that the sun is hot. It may burn our faces and hands painfully, and there are parts of the world on which the sun shines so directly through the air that no one can stand his midday strength.

THE REAL HEAT OF THE SUN WOULD CAUSE THE EARTH TO SHRIVEL UP

But all this gives us a poor idea of the real heat of the sun. We know that the degree of heat of anything can be measured by means of a thermometer. Using an ordinary thermometer, we say that the heat of the body is between 98 and 99 degrees, which we mark like this: 98° and 99°. If the heat of the air in the shade is as high as that, we can scarcely stand, so hot is it. Boiling water is hotter still, and the flame of a match or a fire is much hotter than boiling water. For some purposes—as, for instance, in order to melt certain metals—we have to produce on the earth as high temperatures as we possibly can; and by means of electricity, in what is called the electric furnace, we can, with great difficulty and at great cost, produce for a short time a temperature of nearly 10,000°.

All this is very much less than the temperature of the sun. It is by no means easy to find out what that really is, and many calculations have been made. But if we think of the temperature of the surface of the sun as anywhere between 10,000° and 15,000° we shall be within the limits of the truth. The interior must be far hotter. If the earth were raised to that temperature—say, by putting the earth in the atmosphere of the sun—not only would every living creature be burnt up long before the earth had reached any such temperature, but in a very short time the whole earth, including not merely the sea, but the hardest rocks, would be turned into a hot gas which would glow and give out heat and light just as the sun does, though, of course, since the earth is so small, its heat and light would not last very long.

AN IMMENSE FIRE BLAZING FOR EVER 93,000,000 MILES FROM THE EARTH

So great is the temperature of the sun that if the temperature of the earth were gradually raised to it there would come a time when all the compounds would be split up. Chemical compounds cannot exist at such a high temperature as that of the sun. All the water of the earth, after having been made into a gas by the heat, would be broken up into the oxygen and hydrogen of which it is made. Sand and the rocks that are made of burnt or oxidised silicon would be split up into their oxygen and silicon. These elements and all the others, including all the metals, would exist in the form of intensely hot and intensely bright gases. Such a picture gives us some idea of what the composition of the sun is.

The distance of the sun from the earth changes slightly from day to day, as the earth does not move round the sun in a circle, but is a trifle nearer to him in winter than in summer. The difference is very slight, however, and 93,000,000 miles is about the average distance.

Compared with the size of the earth, this distance is a very great one, but, compared with the distance of the other stars, it is a very tiny one. As

Sir Robert Ball says: "The fact is that we are nestled up comparatively close to the sun for the benefit of his warmth and light, while we are separated even from the nearest of stars by a mighty abyss."

How the End of the Earth would be like the going out of a Star

If the sun were to move away from us until at last he were as far away as even the nearest of the stars, the earth would exist in perpetual night, and no creature could live upon it. If it were possible for a man to live upon such an earth, and if the sun at that distance could be seen at all, it would be for him only one of the stars, and by no means one of the brightest. "If the sun and the earth and all which it contains were to vanish, the effect in the universe would simply be that a tiny star had ceased its twinkling."

Perhaps you notice the word tiny and say: "How can the sun be called tiny when we know how big it is?" But all words like great and small, huge and tiny, are *relative* terms. They only mean that a thing is huge or tiny compared with something else. Compared with an atom, the smallest of living cells is huge; compared with a cell, our bodies are huge; compared with our bodies, the earth is huge; compared with the earth, the sun is huge; compared with the size of the visible universe, the sun is tiny; and the whole size of the visible universe, across which it would take light thousands of years to travel, is nothing at all compared with the size of the infinite universe beyond, which we cannot see.

What Galileo saw when he turned the first Telescope to the Sun

In the year 1611, Galileo, with the aid of his telescope, discovered that there were dark spots upon the sun, and that these spots moved across the surface of the sun from day to day. This was a very interesting and important discovery, though it had terrible consequences for Galileo. There was nothing to be found about sun-spots in the writings of the great Greek thinker Aristotle, and so the people who were powerful in the time of Galileo said that what he called sun-spots were due to faults in his telescope or in his eyes. Worse than this, the discovery of sun-spots was regarded as an insult to the sun, as implying that he was not perfect, and therefore as a wicked thing to assert the existence of. But since the time of Galileo we have learnt to regard sun-spots as among the most interesting things in the sun. When large ones are present, anyone can see them for himself by looking at the sun through a smoked glass. If we watch them from day to day, we find, as Galileo himself found, nearly three hundred years ago, that they very often travel right across the face of the sun, from side to side, then disappear, and then appear again on the other side.

We notice also that as they reach the side of the sun they seem to get narrower, as if we were looking at them sideways. This can only mean that the sun spins round upon himself, and we now know that he takes rather more than twenty-five of our days to do this —that is to say, that while the sun spins round once, the earth spins round more than twenty-five times. We are not quite certain, but it may be as many as twenty-seven times. The earth's spinning makes day and night for us, but of course it makes no difference to the brightness of any part of the sun, which is the source of our day.

How the Spots on the Sun show us that the Sun spins round

The study of the sun-spots as they travel across, and as they change their apparent shape, helps us to prove how the sun spins. We find a spot travelling across the sun in about twelve or thirteen days, and then we may find the same spot appear again on the other side of the sun after about twelve or thirteen days more. We find that sun-spots always travel in the same direction, which is, of course, the direction in which the sun spins. We find also that the sun spins round in the same direction as the earth does, and in the same direction as the earth and all the other planets revolve round the sun. The same is true of the direction in which the moon travels round the earth, and the direction in which the moon spins upon itself. This great fact about the movement of the sun, the planets and their moons lead us, like many other facts, to believe that all these bodies really have the same history, and were formed from one parent, as we read on a former page.

Sun-spots are noticed at various parts upon the surface of the sun, and there are other parts where they are not noticed. We do not often see them close to the Equator or middle line of the sun, and we never find sun-spots near the Poles of the sun. There are certain zones or belts which correspond pretty well to what we call the temperate zones of our own earth, where alone the sun-spots are found.

Of course this fact means something as to the way in which the different parts of the sun are made, but we have not yet been able to understand it. Occasionally we find a sun-spot close to the Equator, and occasionally one not so very far from one or other of the Poles. When we compare the rate at which these various spots move, we find that those nearest the Equator travel completely round the sun in less time than those nearer the Poles. If these were spots upon a solid body which rotated all in one piece, as a top does, they would all take the same time to move round.

THE MYSTERY OF SUN-SPOTS THAT WOULD COVER UP THE WHOLE EARTH

The fact that the sun-spots move at different rates can only mean that different parts of the sun's surface go round at rather different speeds, as is quite possible in the case of a body that is not solid, but is made of gas. Lately, in careful study of the giant planet Jupiter, it has become almost certain that various parts of his surface move round as he spins more or less independently of one another, and this doubtless means, as it does in the case of the sun, that the surface of Jupiter is not solid, but either gaseous or perhaps partly gaseous and partly liquid.

What we usually call sun-spots are darker than the rest of the sun. There are many spots also, perhaps more than the dark spots, which are brighter than the rest of the sun. We do not yet know what these spots really mean, though we can study the light which comes from them, and hope soon to learn something by splitting it up and finding what it is composed of. We must think of the surface of the sun as consisting of hot gases reaching to a tremendous depth. These gases are in a state of great commotion, as we learn when we study the sun in other ways, and the various spots, dark and bright, which we see upon the sun may depend upon the collection of particular kinds of gases at particular places. They may be due, as has been asserted, to uprushes of gas coming from the deeper parts of the sun, but we cannot really explain them yet. We call them spots, but we require a better idea of their size than that word gives us. It is not uncommon to notice a spot upon the sun into which a couple of earths could easily be bundled.

THE WAY IN WHICH CHANGES ON THE SUN'S FACE MOVE A NEEDLE ON THE EARTH

Another thing which has not yet been explained, but which it is very interesting to know, is that there is some connection between sun-spots and various things which go on upon the earth, especially changes in the earth that have to do with its magnetic power. Changes in the earth's magnetism and in the movements of magnetic needles on the earth correspond with changes in the number and size of the dark sun-spots. When we come to think of it, this is an amazing thing—that these changes, whatever they are, in the surface of the sun should be registered by magnet needles on the earth. Probably it is not right to say that sun-spots cause the disturbances in the way in which the earth, that great magnet, attracts the compass needle. It is more probable that something happens in the sun which at one and the same time causes the spots there, and also so affects the quality of the various influences which the sun pours upon the earth as to cause these changes in its magnetism.

THE SUN'S ELEVEN-YEARS PUZZLE THAT SETS THE SCIENTISTS THINKING

There is something even more remarkable about sun-spots, which is that the number and size of them change from year to year in a regular way. There can be no doubt about this, for sun-spots have been carefully watched for three hundred years, and we find that through all this time there has gone on a regular increase and decrease in the number and size of sun-spots, which at the end of eleven years are just about as many and as large as they were at the beginning, and then repeat their changes for another eleven years, and so on. When a change in anything goes round and round like this in a

THE SUN'S MIGHTY CROWN OF LIGHT

This picture gives us some idea of the shape and splendour of the great ring of light round the sun, though no picture can give any real idea of its magnificent beauty. The pity is that only for a few seconds, once in many years, when the moon hides the body of the sun from our view, have we any chance of seeing this mighty crown of light; but of course it is always there. The part of it that is nearest to the sun is intensely bright, but it gives out a paler light than the red prominences which can still be seen blazing through it at various points.

regular way, we call one round a cycle (that is, a circle—bicycle means two circles). So we say that the sun-spots show an eleven-year cycle. Whatever causes them is something which waxes and wanes at this rate. What it is and why it should do this, we do not at all know, but it is one of the facts which will some day help us to understand something about what goes on in the inside of the sun.

How Sir Norman Lockyer showed men a new light on the sun

It so happens, fortunately for us, that the size and distance of the moon, compared with the size and distance of the sun, are just such that, now and again, the moon, passing between us and the sun, almost exactly fits for a few seconds or minutes over the body of the sun, as it were, so that anything projecting from the body of the sun on any side can be seen. Such things exist. They are very beautiful in themselves, and they tell us a great deal about the surface of the sun. They are not bright enough, however, compared with the blaze of sunlight, to be seen as a rule, any more than the stars can be seen in the daytime. Only during a total eclipse of the sun, when the body of the sun is hidden by the moon, can we clearly see these things which project from it.

Some years ago, however, the great English astronomer Sir Norman Lockyer made an instrument by which astronomers can see these prominences of the sun, even when there is no eclipse. The prominences are great masses of hot gas. They give out light of a different kind from that given out by the body of the sun, and Sir Norman Lockyer's instrument enables the astronomer to cut off the ordinary sunlight from his eye—as the moon does during a total eclipse, but in a very different way—and so to see the prominences by themselves. They are notable for their enormous size and their splendid red colour.

The gigantic flames of fire that would consume the world

We do best to think of these prominences as gigantic flames, and we find that, like other flames, they flicker, though of course they are so enormous and so far away from us that they require to be watched for many minutes or some hours before we notice their movements. A total eclipse lasts only a very few minutes at the most, and it would never have been possible to learn what we know about the prominences if astronomers were not able, as we have seen, to watch them now for hours at a time. We can sometimes see one of these great red flames starting forth from the surface of the sun, and dashing outwards. We thus come to see that the surface of the sun is far from being a steady, quiet thing, but is endlessly disturbed by mighty tempests. No storm that travellers ever experienced on the earth can compare for a moment with the storms upon the sun, which are made by gases more intensely hot than the hottest earthly furnace. We can measure the length that these flames often attain to. Many have been measured ten or more times as long as the diameter of the earth, and nearly thirty years ago one was watched which, in the course of an hour or two, dashed out from the sun to the distance of more than one-third of a million of miles. Then, in only a few minutes more, this mightiest of flames broke up and shortly disappeared.

The sun's beautiful crown, which men have seen for only a few seconds

Some idea of its force as well as its size is given us when we learn that this flame must have dashed out from the sun at the rate of fifty miles a second—a speed "more than a hundred times greater than that of the swiftest bullet ever fired from a rifle."

Our English word crown, meaning something that surrounds the head, is derived from the Latin word *corona*. The sun, as we can see, during a total eclipse, has a mighty crown or corona. The picture on page 2085 gives some idea of the shape and splendour of this ring of light round the sun, though no picture can give any idea of its magnificent beauty. We should always carry in our minds a picture of what the sun looks like during a total eclipse, and then, when we look at the sun any day, we should try to remember how vastly more wonderful he would look if it were not that our eyes are mastered by the light which comes from his body, so that the wonderful things glowing all around it cannot be seen by us.

FLAMES THAT WOULD SHRIVEL UP THE EARTH

The surface of the sun, like the surface of the earth, is not smooth like a ball; the flames fly out in all directions, fiercer than any heat known on the earth, and long enough to shrivel up the earth like a speck as in this picture, which shows how the earth would look in the midst of the sun's flames. The picture is drawn as if the sun were eclipsed by the moon, and we were looking from another world. The surface of the sun is endlessly disturbed by mighty tempests of fire, and many of its flames have been measured ten times as long as the distance across the earth.

The great things which the sun produces are heat and light. These are waves in the ether—not material things like atoms or pieces of atoms. But lately we have been studying upon the earth the things that are given out by flames, by hot gases, and even by hot, solid metals. These things, like the sun, give out light and heat, but they also give out tiny pieces of electrical matter which go to make up atoms and which we now call electrons.

THE LITTLE BITS OF ELECTRICITY THAT ARE ALWAYS FLYING OUT OF THE SUN

The hot matter that makes up the sun is in ceaseless violent movement giving out electrons. On all sides without end, the sun is pouring out not only heat and light, but also these tiny particles which rush through space, and probably account for some of the things which happen in the solar system. It may possibly be, for instance, that the reason why a comet develops a tail as it approaches the sun, and leaves the sun with its tail in front of it instead of behind it, is that these electrons from the sun strike the comet, and drive the lighter part of it in a stream on the side away from the sun.

We already know that there are no compounds in the sun, and why that is so. When we study the light of the sun we are able to find out what elements it mainly contains, or, at any rate, what elements are contained in its outer parts. The corona of the sun seems to consist mainly of hydrogen, and Sir Norman Lockyer thinks that there is also another element there which does not occur upon the earth, as the earth is at present, and to which he has given the appropriate name of *coronium*. Nearer the body of the sun we find proof of the existence of the gases or vapours of many elements which we know well, and which can be found in our own bodies—hydrogen, calcium (or lime), magnesium (which gives such a bright light when it is burnt), sodium, and iron; and besides iron a large number of other metals well known on the earth.

THE SUN IS PERHAPS A STAR IN THE MIDDLE OF ITS CAREER

It is very important to compare the sun in these respects with other stars. We now know that all stars, including the sun, have a history; that they cannot remain bright for ever, but must gradually cool. As they cool, the chemical composition of their outer parts changes, and so the quality of their light changes. We believe, then, that the sun is somewhere in the middle stage of a star's history. At its hottest and most brilliant stage a star gives out a very white light. Such a star is Sirius, the brightest star in the heavens so far as eyes looking from the earth are concerned. Later on we suppose that changes occur in the elements of a white-hot star; it gets somewhat cooler, and becomes yellow-hot like the sun; and we can see other stars in the heavens which we may call red-hot, the chemical composition of which, as judged by their light, is correspondingly different from that of the sun at present.

THE MARVEL OF THE SUN'S GREAT POWER IN ALL OUR DAILY LIVES

We know enough to allow us to say that the sun and the planets and their moons are really separated parts of one great whole. We know that all these parts are slowly losing heat and shrinking. We can learn from the study of the stars and the nebulæ in many parts of the heavens something of what the history of the sun must have been. From other stars, the redder ones, from the little we know of the dark stars that cannot be seen, and from the study of our own earth—which, after all, was once a little sun, but has cooled down very quickly—we can guess a good deal as to the future of our sun.

Meanwhile, we know that he is what he has been since life first appeared on earth, and what he must continue to be so long as life remains on earth—the great source of the power which, mainly in the form of light and heat, and also in other ways which we are only beginning to understand, sustains all life, makes the rain and the rivers, gives every visible part of the earth its light and colour and beauty, supplies the food of the green plants upon which we feed, and so works in our muscles every time we move, in the eyes which see the beauty of the earth and of the sun itself, and in the brains by means of which we try to learn how all these things come to be.

The next part of this is on page 2219.

SNOWDROP AND THE DWARFS

CONTINUED FROM 1983

ONE winter's day, when the snow lay deep on the ground, a gentle Queen sat by her window working. As she worked she pricked her finger, so that two little drops of blood fell from it. The Queen sighed and said:

"How I wish that I might have a little daughter with cheeks as rosy as those drops of blood, with a skin as white as snow and hair as black as the ebony window-frame!"

To her great delight the Queen's wish was granted, and before long a little daughter came, whom she named Snowdrop.

Soon after this the good Queen died, and Snowdrop's father, the King, married another lady, very beautiful, but very unkind and vain. She knew that she was the most beautiful lady in the land, because when she looked into her magic mirror, and asked:

"Say, glass that hangest on the wall,
Who is the fairest of beauties all?"

the glass would always answer:

"Thou, Queen, art fairest of beauties all."

As the years rolled by little Snowdrop grew into a very sweet and lovely girl, and one day when the vain Queen asked the glass the old, old question, to her great surprise it replied:

"Fair and lovely though the Queen,
Snowdrop lovelier far, I ween."

This sent the jealous Queen into such a frightful rage that she immediately summoned her servants and gave orders for Snowdrop to be killed. But all the people in the castle loved Snowdrop, and, instead of killing her, one of them, a good, kind girl, took her into a wood and there left her, in the hope that somebody might see her and befriend her.

Left alone, poor Snowdrop wandered about in the wood until she came to a little cottage. She opened the door and went in. Inside she found seven little beds, seven little loaves, and seven little glasses of wine. She ate a good supper, and then, being very tired, she lay down and fell fast asleep.

Now, the cottage belonged to seven dwarfs, and when it was quite dark they returned, lit their seven lamps, and entered. On the bed they found a lovely maiden asleep.

"How beautiful she is!" they exclaimed, all together.

At this Snowdrop awoke and sat up in bed.

"Do not be afraid," said the dwarfs, "for you are among friends. But, tell us, how came you here?"

Then Snowdrop told her story, and the dwarfs, who were charmed with her beauty and sweetness, offered her a home.

"But," said they, "be careful to keep the door fast while we are away lest the jealous Queen find you and do you harm."

Sure enough the Queen did find out where Snowdrop was, and, dressing

THE DWARFS FIND SNOWDROP ASLEEP

When it was quite dark the seven dwarfs returned, lit their seven lamps, and entered their cottage. On the bed they found little Snowdrop fast asleep. "How beautiful she is!" they exclaimed, all together.

herself up as an old woman, she set off for the cottage. Presently Snowdrop heard somebody calling:

"Fine wares to sell! Fine wares to sell!"

She opened the window and leaned out, and indeed the ribbons and laces that she saw before her were so pretty that, forgetting all about the dwarfs' warning, she unbolted the door and ran out.

"I think I will buy some laces," said she.

"Let me fasten them into your dress for you," said the old woman, who at once set to work to tie them so tightly that little Snowdrop fell down as if dead.

"There is an end to all your beauty," said the wicked Queen.

Soon the dwarfs came home, and they no sooner saw Snowdrop than they guessed what had happened. Quick as lightning one of them drew out a knife and cut the cruel lace. In a few minutes Snowdrop revived and related her story. When they went away the next morning the dwarfs again warned Snowdrop to open the door to nobody until they returned.

Late in the afternoon Snowdrop looked out of her window and saw a strange old woman in a red shawl with a basket on her arm.

"Fine wares to sell! Fine wares to sell!" she called.

"What have you to sell?" asked Snowdrop.

"Come to the door and I will show you," answered the old woman.

"I dare not," said Snowdrop. "But, oh, what beautiful combs!"

"Try one on," said the old woman, handing one in at the window.

Snowdrop took it in her hand, but the comb was poisoned, and when it touched her hair she fell down as if dead.

Soon the dwarfs came home. They saw the comb and drew it out, and immediately Snowdrop revived.

As soon as the wicked Queen learned that Snowdrop had escaped her a second time she painted her face, dressed herself as a peasant, and went again to the cottage. This time she took with her a beautiful apple which she had filled on the side with poison.

"Would you like this pretty apple?" said she, holding it up to Snowdrop as she leaned out of the window.

But Snowdrop was wise now, and would not take it.

"Perhaps you think it is poisoned," said the old woman. "See, I will eat the white side and you shall eat the red."

The apple did look very tempting, and as the old woman had eaten of it it certainly could not be poisoned, thought Snowdrop. So she put out her hand, took the apple and put it to her lips. But no sooner had she taken one mouthful than she fell down as if dead.

Then the Queen returned to the palace, and, taking her magic mirror in her hand, asked:

"Who is the fairest of beauties all?"

This time the mirror answered:

"Thou, Queen, art fairest of beauties all."

Then the Queen knew that at last Snowdrop was dead.

At dusk the dwarfs returned to the cottage as usual, but this time all their efforts to restore her were useless. Snowdrop was dead. Sorrowfully they dressed her in a beautiful robe, and placed her in a crystal box ornamented with gold, and set it on a hill for everyone to see.

One day a Prince passed that way, and he was so struck with Snowdrop's beauty that he paid the dwarfs a large sum of money to allow him to carry it away. As it was lifted down one of the servants stumbled and fell. The door of the crystal box flew open, the piece of poisoned apple fell out of Snowdrop's mouth, and she revived and sat up.

"Where am I?" she asked.

The Prince, who was overjoyed to find that the beautiful lady was still alive, came forward and helped her down. He had learned the story of the jealous Queen's wickedness from the dwarfs, and so he was able to tell Snowdrop what had happened.

"I love you better than anyone in the world," he said, when he had told her all. "Come with me and be my bride."

Snowdrop smiled and gave him her hand, and went away with her Prince to his father's palace, where they married and lived happily ever after.

The Queen was invited to the wedding; but she was so furious that the Prince's love had brought Snowdrop to life again that she fell down in a fit, from which she never recovered.

IN THE DAYS WHEN MEN WERE GOOD

In the days when all men were good they were given a miraculous power over everything. Lions and mountains and whales and forests, and birds and rocks and clouds and seas, moved about quietly from place to place, just as men ordered them to move. Every man was then a real king of the earth, and all living creatures and lifeless things obeyed him. But the human race at last lost its miraculous power through the laziness of a certain man. He was a Bulgarian woodman, and one morning he went to a forest in the Balkan Mountains and cut a bundle of firewood.

"Now march off home," he said.

The great bundle of wood at once got up and began to walk, and the woodman tramped on behind it. So far, so good. But the woodman was a very lazy man.

"Now, why shouldn't I ride instead of tramping along the dusty road?" he said to himself.

And he jumped up on the bundle of wood as it was walking in front of him, and sat down on top of it. But the bundle of wood then refused to go. The woodman got angry, and began to strike it fiercely with his axe. But all in vain. And suddenly the heavens opened, and a terrible voice cried out from the sky:

"Man! You have been lazy and wicked, and, instead of being carried by your bundle of wood, you shall carry it yourself on your shoulders."

And from that time the human race lost its power, and it no longer happened that everything moved at its command.

THE MAGIC PEN OF TRUTH

Jack Lindon saw it in the Japanese shop in New Bond Street. It was a lovely pen made out of green jade, with a golden nib engraved with curious signs.

"I'll buy that for Letty," he said.

To his surprise he found that its price was only a shilling.

"I got it very cheap from a lawyer," said the Japanese merchant. "He said that it had ruined his business."

Jack gave the pen to his pretty sweetheart, Letty Ferrars, and she used it in writing her love-letters to him. But one evening, alas! the lovers quarrelled. Letty went home, and seized the pen and wrote Jack an angry letter, saying that she did not care for him, and would never see him again. But in the letter that Jack received she said:

"Dearest Jack,—I'm very sorry we quarrelled. I love you still with all my heart. Come and make it up, or I shall be unhappy."

For the pen was enchanted. It wrote down what the writer really thought and not what the writer pretended to think. On receiving the letter Jack ran to Letty's house. She said she did not want to see him, but when he showed her the letter written with the pen of truth, she kissed him, and soon afterwards they were happily married.

THE PRINCESS OF THE IVORY CASTLE

The Emperor of China was out hunting by himself one day, and he stopped at a stream and began to drink the water out of his hands, as he was very thirsty. On stooping down over the stream he saw the face of a beautiful maiden reflected in the water, and, thinking she was standing behind him, he turned round to look at her.

There was nobody to be seen. But every time he looked in the stream he saw the face of the beautiful maiden. He at once brought all his wisest mandarins to the stream, and showed them the reflection of the beautiful maiden.

"That is the Princess of the Ivory Castle," said the oldest mandarin. "But nobody knows where the castle is."

"I will find it," said the Emperor, "or spend all my life in looking for it."

For three years he wandered over the world, and at last he came to a lake in which he saw the reflection of an ivory castle. He looked up, expecting to see the castle standing on the hills above the lake. But the hills were wild and bare.

"How foolish I've been!" said he. "Of course, this is what I ought to have done when I first saw the Princess."

He jumped down to the bottom of the lake, and there he found the ivory castle. In it sat the Princess waiting for him, for she had also seen his reflection in the stream. And he led her out of the lake and married her, and they lived happily together.

THE LAND OF YOUTH

THERE was once a Czar of Russia who fell ill of a disease which no doctor can cure, but an aged woman said to him :

"Oh, Little Father, when I was very young I heard of a land called the Land of Youth. In that land is a fountain of the water of life. Send one of your sons to get some of that water for you."

The Czar at once gave his eldest son, Prince Michael, a great sum of money, and asked him to go in search of the Land of Youth.

Prince Michael departed, but on arriving at the City of Pleasure he went no farther. The Czar then sent his second son, Prince Peter, but Peter met his brother in the City of Pleasure, and also stayed there.

Prince Vladimir, the youngest son of the Czar, then wanted to go, but the Czar feared that his two elder sons had perished, and he did not want to lose his last child. Vladimir, however, grieved to see his father grow weaker and weaker, so one night he also secretly set out to get the water of life.

He passed through the City of Pleasure and entered a vast wilderness, which took him twenty days to cross, and came to a great sea. By the seashore he found a very old woman, and he asked her the way to the Land of Youth.

"I am a thousand years old," said she, "and I have never heard of such a place. But perhaps my friends know."

She went down to the shore and blew upon a horn, and the water was churned into foam by the multitude of fishes that came to her call. No fish, however, knew of the Land of Youth. But as Vladimir was going away a whale came hurrying up.

"Can you take this handsome lad to the Land of Youth?" said the very old, old woman.

"Certainly," said the whale, "if he will wait till midnight. The Fairy of the Fountain and her two dragons will then be asleep."

So at midnight Prince Vladimir got on the whale's back, and was swiftly carried to the enchanted land. He stole to the fountain where the fairy was sleeping beside her dragons, and filled two flasks with the magic water. But he saw the fairy's face, and was so moved by her strange beauty that he resolved to return, when he had cured his father, and try to win her love. In order that she might know him, he placed round her neck a chain of jewels with a locket containing his portrait.

He then travelled back on the whale to the very old woman, and gave her one of the flasks, and she drank the water and became a beautiful maiden. He then crossed the wilderness, and showed the other flask to his brothers in the City of Pleasure.

Michael and Peter, however, killed him and then took the flask to the Czar, and said that Vladimir had been slain.

Their father drank the water and became young again. This made him so grateful that he proclaimed that Michael should rule over Northern Russia, and Peter over Southern Russia. But as he spoke two dragons rushed down through the air and killed the wicked brothers. On one dragon sat the fairy, on the other sat Vladimir.

Having fallen in love with Vladimir's portrait, the fairy had set out to find him, discovered his body and restored it to life with the magic water. She now told the Czar why she had killed his two elder sons, and then led Vladimir back to the Land of Youth, where the two lovers still live together, ever young, ever loving, and ever happy.

HOW THE FRENCH REACHED MOSCOW

It is a fine thing for an army in a foreign country, which has marched and starved and thirsted for many weeks, to see at last a great city raising its spires in the air, and sending the smoke from thousands of happy chimneys into the wide dome of the sky.

Such a sight as this met the Grand Army of Napoleon in Russia. And the city was Moscow.

NAPOLEON'S MARCH THROUGH THE SILENT STREETS OF A SPLENDID CITY

After desperate battles, after heroic marches through the most wild and desolate country, thirsty, hungry, wounded, and weary, the French soldiers beheld the magnificence of the Russian's holy city flashing and sparkling in the air.

No Russian army disputed their approach. They marched towards this great city, which was crammed with merchandise, provisions, and wealth, as if it were their own Paris. Not a shot was fired. Not a soldier was to be seen. What had happened?

The truth is that, as Napoleon approached the city at one end, the Russian soldiers were marching out at the other.

So it came about that Napoleon marched at the head of his great army into this magnificent city, and found no one to stop him. The Russian people could hardly believe that it was Napoleon. They were taken completely by surprise.

The wife of a priest was sitting at her window knitting a stocking when the deacon's wife came running to her with the news that Napoleon had come. The priest's wife called to her husband, who was writing in the next room, "Do you hear this? Napoleon is here!" The priest did not stop writing. He laughed. "Do not be stupid," he answered; "go and make the tea." No one believed that Moscow had fallen.

THE GREAT MYSTERY OF MOSCOW AND ITS AWFUL DOOM

The French soldiers could not understand the silence. The city was deadly still. Street after street was passed and nothing happened. The bands of their army played "The Victory is Ours," but no one came to listen or to sing. The soldiers looked up at the windows of the houses, half expecting shots to be fired at them; not a face stared out at them. They began to feel a little frightened.

In an hour's time the awful, the terrible, the unwriteable horrors of plunder had begun. Can you not imagine what it must be when thousands of starving and thirsty soldiers are turned loose in a rich city filled with unarmed men and women? You can imagine some of the horrors; but, thank God, you cannot imagine all. We dare not write them down.

Soon, very soon, the splendid city of Moscow was filled with horror. Shrieks of "Murder!" rose from every street. People were seen running wildly, with blood upon their faces, crying, "Murder, murder!" the soldiers pursuing them.

Nothing was sacred—not even the holy women who give their lives to the poor. Churches were plundered. Treasures of art were destroyed. Sacred things were thrown to the fire. A mad and drunken soldiery went hither and thither, bursting into private houses, running up the stairs, entering the rooms of the sick, the dying, and the dead, stealing and murdering, behaving like wild beasts.

There was but one cry in the city—the scream of "Murder!" The poor people of Moscow found themselves in the power of evil.

THE BEAUTIFUL CITY OF MOSCOW BECAME A VAST BONFIRE

Suddenly a cloud of smoke rolled upward into the darkening sky, and a thin tongue of scarlet flame licked through it, dancing in a shower of sparks. Then the same thing occurred in another quarter of the city, then in another. The smoke rolled upward, the flames shot through the clouds.

"Our soldiers are setting fire to the places they have sacked," thought the French generals. "We shall have to be careful. To-morrow we will see to it. Let us go to the theatre to-night."

But it was not the French soldiers. It was the Russian people. The citizens of Moscow were burning their own city, the sacred city of Moscow. They had no arms; they could neither resist the French nor avenge the

dreadful things done to their wives and children; but they could burn the city, and leave the French to perish.

While the work of murder went on, the flames crept forward. The soldiers drank—the city burned.

In a very short time great districts were nothing more than gigantic bonfires. Churches and palaces quivered in sheets of flame. The noise was like a whirlwind. The heat was like a furnace. In streets far away the stones became so hot that they burned through leather soles. The gutters were filled with leaping floods of molten copper and lead, streaming from the roofs of churches and houses. French soldiers sought to check the conflagration.

For four nights they toiled—four nights in which no lamps or candles were needed, so vivid was the light of the victorious flames. Shrieks of "Murder!" still issued from the houses. Women and children still ran screaming from their butchers. Old men were still beaten to their knees in the streets. Nuns and Sisters of Mercy still tore hither and thither to escape the soldiers. Little boys and girls still ran and hid in cellars. Everywhere still sounded the terrified shrieks and screams of the poor Russians. But louder than their shrieks roared the great fire; and fiercer than the French were the scorching flames which leapt from roof to roof, from street to street, from square to square, like a tempest of fire.

A wind blew hard on the flames, and fanned them as a blacksmith fans his furnace. The noise was deafening. The heat singed the hair on the face, cracked the lips, and suffocated the lungs. On and on came the fire. With bellow like thunder, the mighty roof of a cathedral crashed down, and up whirled a black mass of smoke, pierced presently by a thousand tongues of scarlet fire.

Glass melted and ran with streams of lead through the streets. Trees burned away like matches. Houses of wood vanished in one lick of the red flames. On and on. No one could stop it now. The wind blew victory to the flames.

And Napoleon began his retreat.

Suddenly in the midst of the clamour there came a bursting roar, which shook every stone in the city and deafened the ears of the people. The great arsenal had exploded. People went mad from that shock. Palace walls were split as an axe splits a log.

Outside Moscow, Napoleon was marching away with his army, back over the thousands of desolate miles he had already come. He turned at the sound of the great explosion, and looked with wrath at the smoking ruin.

In Moscow he had counted to find provisions for his troops, and then to advance again, from victory to victory.

Now he was retreating from a heap of cinders. Fire had driven him back.

He turned his head and continued the retreat. The way was long. No cities broke its monotony. And there on that long path, waiting to destroy him, waiting to seize him with hands of ice, and breathe upon his brain the deadly cold of despair, was Winter, White Winter, the other wing of the destroying angel who is Flame and Snow.

THE WANDERING SHEPHERDESS OF THE MOORS

In the days of King George the Third, all the beaux of Exeter vainly waited for a sign of love from Maria Selwyn, the gentle, beautiful heiress of Squire Selwyn. But Maria had already given her heart to a handsome shepherd, and she used to steal out at dawn and meet him in the silent meadows.

But one unhappy morning the old squire also rose early, and he saw the two lovers sitting together under a thorn. The sight drove him mad with anger, and he had the shepherd lad attacked, and the next morning Maria found her sweetheart nigh to death.

"All I have in the world, dearest, are my sheep. I leave them to you. They shall follow you," he said, as he died.

The girl was crazed with grief. Her father shut her up and hunted the sheep away; but she got out of the house, and began to wander aimlessly about England, and the sheep followed her.

She at last crossed the Scottish border with her strange flock, and she perished on the wild moors near Kingswell. Her sheep then would neither eat nor budge. They pined away, and some kindly Scottish peasants buried them around their mistress.

THE THREE MAIDSERVANTS

HEARING that a farmer's wife wanted a maidservant, three girls came to her house to get the place.

"Now," said her husband, "I will show you how to choose a good servant."

He placed a broom across the path leading to the farmhouse door, and he and his wife watched the girls as they came along. The first girl kicked the broom aside, and the farmer said: "She's an **idle lass, and won't bend her back.**"

The second girl skipped over the broom.

"She won't do," said the farmer. "She'll skip her work."

The third girl picked up the broom, and put it in a corner out of the way, and the farmer said:

"That's the girl for me; she is tidy, careful, and hard-working."

So this girl was **chosen for the place.**

MOTHER SHIPTON

IN the year 1488 a very strange little girl was born in a cottage by the Dropping Well at Knaresborough, in Yorkshire. She had a long, hooked nose and a turned-up chin, and her eyes were like the eyes of a wise old woman.

She was sent to school only once, and she then showed the schoolmistress that there was no need to teach her the alphabet; for she at once read off with the greatest of ease the most learned books that could be found in the parish. But she did not show the marvellous gifts she possessed until she was married to Toby Shipton. Then one of her friends lost a new smock and petticoat, and came to her for help.

"Go to the market cross next market day at noon," said Mother Shipton, "and you will see what you will see."

Her friend did so, and at noon a woman came to the market cross with the smock and petticoat, and cried aloud:

I stole my neighbour's smock and coat;
I am the thief, and here I show't.

And after making the confession in the sight of all the people, she gave back the things to the rightful owner.

The fame of Mother Shipton soon spread throughout England, and she moved from Knaresborough to York, and Cardinal Wolsey sent the Duke of Suffolk to ask her to prophesy about him. And Mother Shipton said:

"The Cardinal will see York, but he will never come to it."

"If he does come to York, he will burn you for false prophecy!" said the Duke.

Mother Shipton took her handkerchief and threw it into the fire, saying: "I will burn when that burns!"

And though the Duke of Suffolk stirred up the fire, and thrust the handkerchief right into it, the handkerchief would not burn.

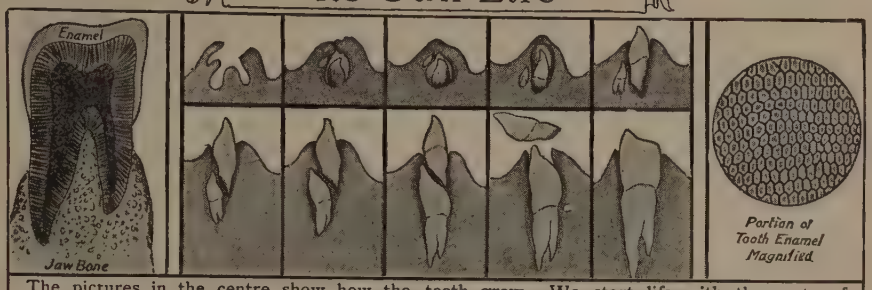
Cardinal Wolsey then came to Cawwood, which is only eight miles from York, and climbed up the tower and looked at the city, and someone told him of Mother Shipton's prophecy.

"I will go to York at once, and burn her for a false witch!" said the proud Cardinal.

But just as he was setting out for York he was arrested on a charge of high treason by King Henry, and he died as he was being taken to be tried at London. Mother Shipton lived to a great age, but many of the stories told of her are invented by modern writers.

The next Stories begin on page 2140.

KNARESBOROUGH, THE HOME OF MOTHER SHIPTON



The pictures in the centre show how the teeth grow. We start life with the roots of two sets of teeth, the first set growing until the second and stronger set pushes it out

THE MOUTH AND THE TEETH

CONTINUED FROM 1964

As every living thing burns, every living thing must feed, or its body will be consumed. This is equally true of plants and animals. There are plants which catch insects by leaves that fold up when they are touched, and in these cases the leaves act very like the mouths of animals. But in any case the leaf of a plant is its mouth, since part of its food—its gaseous food—is taken from the air by it. The liquid food of a plant is taken by its roots; so we may say that it has two sets of mouths, according to the two kinds of food that it lives upon.

In the humblest animals, such as the amœba, the eating is done by any part of the surface of the cell—which is the whole body of the animal. We saw on page 1005 that, when the amœba approaches something fit to eat, a sort of mouth appears, just for the occasion, on the side of the amœba next what it wants, and so the particle of food is "swallowed."

But it is not long in the history of animal life before we find a permanent mouth appearing as a definite part of the structure of the animal's body.

When we come still higher, to the animals that have backbones, there is never any mistaking the mouth. These animals, we know, have their bones or skeletons *inside* their bodies, whereas an animal without a backbone, like a lobster, has its skeleton outside its body.

The backboned animals have heads consisting of two parts which we can always distinguish, the skull and the face. The face has openings in it for the entry of air and food—openings which we call nose and mouth; and the bony skeleton of the face always includes two strong bony arrangements which we call the jaws. The upper jaw is always fixed to the rest of the face and skull. You never move your upper jaw when you speak or when you bite. You can only move it as part of the whole head. But the lower jaw hangs from the skull, and is movable. The jaws are very strong, and the movement of the lower jaw *upwards* is controlled by very strong and large muscles, for purposes of biting.

Further, whether the food be grass or whether it be the body of some other animal, it must be torn and cut and crushed, and so we find that there appear in the jaws things called teeth. These appear first in fishes, and we can prove that they really develop from an infolding of the skin round the mouth. They are really skin structures like nails, as we have seen. But in the course of animal development they have become fixed in the jaws. If you can get a glimpse of the open mouth of a tiger, you will see what a magnificent machine, for power and effectiveness, has been made by this combination of jaws and teeth. The jaws of a tiger

cannot always be seen, but a cat is really a kind of small tiger—at any rate, a tame cousin of the tiger—and if you look at the jaws and teeth of a cat you will see the same wonderful arrangement as the tiger's, only on a rather smaller scale.

The oldest and first birds, we know, had teeth; but no kind of bird now living has teeth. The beaks of a bird correspond to our teeth and lips.

THE MANY KINDS OF TEETH AND THE WORK THAT THEY DO

Teeth are of many different kinds—some are for catching and tearing, like the long teeth of the dog or cat; others are for spearing, like the long teeth of the elephant, which we call its tusks, and the beautiful hard outside of which we call ivory. Others are for poisoning, like the poison-teeth of snakes, which have a channel running through them for the poison which the snake makes in glands below and beside its lower jaw. And most of the animals that have teeth have teeth for crunching, munching, and grinding. These are usually behind, of course, while the sharp teeth that catch or bite, or spear or poison, are in front, where they will be most useful.

The teeth of different kinds of animals are a very good guide, even if we have nothing else to go by, to the habits of the animal the jaws belong to. You would not expect a cow to have the same kind of teeth as a tiger. The study of the teeth of animals is of great value in understanding how animals are arranged in classes, and also how different kinds of animals are related to each other. All human beings have the same number of teeth—to begin with—and the teeth are of exactly the same kind, and the same number of each kind.

HOW THE TEETH HELP US TO UNDERSTAND THAT ALL KINDS OF MEN ARE ONE

This is one of the arguments against people who used to declare that "savages" and negroes are very different from ourselves, and are somehow descended from different kinds of creatures from ourselves. Also the oldest human skulls we can find anywhere—some of them going back more thousands of years than you can realise—show the same arrangement of teeth as all human beings do still. This exact arrangement is different—though not very different—from that found in any other kinds of living creatures except the highest monkeys or apes. The kinds of apes which are most nearly similar to man have the same arrangement of teeth as he has. In the lower monkeys the arrangement is slightly different.

As everyone knows, we have two sets of teeth. In the first set we have twenty, and in the second set thirty-two. The first teeth of the first set begin to appear about the sixth or seventh month after we are born. The first teeth of the second set begin to appear at about the age of six; and the last four of the thirty-two do not show above the gums until we are nearly grown up, which is when we are supposed to be wise, so they are called "wisdom" teeth. The number of teeth in each jaw, and on each side of each jaw, is the same. The flat front teeth are called incisors, or cutters; the corner teeth, canines, because these are the teeth so big in dogs; and we may call all the rest molars. The last molar on each side of the two jaws is a wisdom tooth. There is no doubt that the teeth and jaws of human beings are growing smaller and weaker. In many people the wisdom teeth never appear at all.

THE HISTORY OF OUR TWO SETS OF TEETH, AND THEIR NAMES

Of course, the reason is that teeth are getting less and less important as man gives up, one after another, his animal ways of doing things. Now we can choose and cook our food, and though good teeth are always a blessing, yet people may live happy and useful lives even though they have lost all their teeth.

The teeth of upper and lower jaws are not set exactly opposite each other. Thus, if a tooth is lost, the tooth that corresponds to it in the other jaw is not made useless for the rest of the person's life. It still meets part of a tooth next the one that has been lost. This peculiarity in the arrangement is a most valuable one. But for it, to lose one tooth would mean really losing two.

When our teeth are formed they do not grow any more. If they are properly used they remain healthy. This principle is true of every part of every living thing, and it is important that we should understand how to keep our teeth in good condition.

In some animals the teeth grow and grow, but wear each other away, so that they do not get too long. If the tooth of such an animal is lost by accident, the tooth opposite it will go on growing, with nothing to wear it away, and may force the mouth of the animal open until it cannot eat, and it dies of starvation.

Animals that live on other animals always have sharp, tearing, long teeth. These animals are called *carnivorous*, or flesh-eating. Animals that live on grass, and so on, are called *herbivorous*, or herb-eating. They often have no tearing teeth at all, but merely munching, grinding teeth. An animal like a rabbit, which is a *rodent*, or "gnawer," has gnawing teeth.

It is a very interesting question to decide, by studying his teeth, the kind of food that man is really meant to eat; and we are helped by studying the apes which still exist on the earth, though they will doubtless soon die out. We find that these apes live on fruits and the like, *not* on the flesh of other animals; and their teeth, which are practically the same in every respect as ours, are not suited for killing and tearing. Our own teeth belong to the *not* carnivorous type.

The top picture shows both rows of our teeth; the bottom one shows their names, which are the same in each row.

If all our teeth are perfectly sound, or properly filled by the dentist when they have decayed, sweet things will not make them ache. All sound teeth are completely covered, in all the part that shows above the gum, by a layer of what we call *enamel*. This enamel has no nerves in it, and therefore cannot feel. The case is quite different, however, when any part of the enamel of the tooth has been slowly melted away by the acids which microbes produce in our mouths. The part of the tooth underneath the enamel is called the *dentine*. It is much softer than the enamel, so that things can pierce some little distance into it, and it is filled with tiny branches of the nerve that goes to each tooth. These nerve-ends are not disturbed by most of the things we eat, but sugar is one of the things that excite them, and so, if any of our teeth have their dentine exposed, we are liable to get toothache.

Very often it may be only one tooth that has its dentine exposed, yet the whole of that side of the jaw, or nearly the whole of it, may ache. The reason is that all the nerves going to the teeth along one side of either jaw are branches of one nerve, and when any part of it is disturbed, all the teeth to which its branches are distributed are apt to become the seat of pain.

We know that only very rarely indeed do the teeth of animals decay, and we know also that among savages the teeth decay no oftener than they do among animals. But our teeth are very different, and there must be something in our way of life which explains the reason. In the first place, the teeth of many of us are not well made to begin with; the enamel is thin and soft and not smooth enough, so that it cannot resist damage so well as it should. The reason is probably that many of us are not properly fed when we are babies. Perhaps our mothers could not feed us, and we were fed on food which was thought to be good, but really was not. Babies and children who get plenty of fresh milk—and a little cream, too—have better teeth when they grow up than other people. And another cause of the decay of our teeth is the kind of food that we eat after they are formed. Animals and savages eat very hard and fibrous food, whilst some of us actually cut the crust off toast. If we give our teeth no work to do, they are bound to become weak, for it is a universal law of all life that anything which is not used, or has its work done for it, gets weak and helpless.

We should take care of our teeth by not forgetting to give them work to

do. I do not mean that we should try their powers on things like hard nuts, but that we should not be afraid to use our teeth on food instead of cutting it up too much with knives.

IMPORTANCE OF KEEPING TEETH CLEAN AND THE BEST THING FOR CLEANING THEM

Then we must be sure, every day of our lives, and especially at night, to keep our mouths clean. If we do not do this, microbes will grow in our mouths and will form acids, especially one called *lactic acid*, such as is found in sour milk, which is able slowly to dissolve the chalk in the enamel of our teeth. Our saliva fortunately interferes with this acid by using it up, since our saliva contains what is called an alkali, and an alkali, when it meets an acid, combines with it. It is better that the acid should combine with the alkali of the saliva than with the alkaline chalk of the teeth. So we should keep our mouths and teeth clean by using a tooth-powder which is itself alkaline, and is also *antiseptic*, or poisonous to microbes. We should use this powder night and morning. We should not use too hard a tooth-brush, which may wear away the teeth or make the gums bleed, and we should move the tooth-brush up and down, so as to clear the spaces between the teeth, and not from side to side.

A powder is always better to use for the teeth than a liquid, provided that it is a perfectly soft powder, without any grit that would scratch the tooth-enamel. A powder is best because it helps, by mere rubbing, to keep the teeth free from the brown stuff called "tartar," which is apt to cling to them. The best powder is a half-and-half mixture of carbolic powder and prepared chalk to be bought a pound at a time. It is very cheap indeed. It is quite soft, it is very antiseptic, it is strongly alkaline, and it is very pleasant to use. None of the things which are advertised for the teeth are nearly so good, and the cheapest of them is ten times as dear.

WHY SUGAR IS NOT BAD FOR CHILDREN IF THEY ARE HEALTHY AND CLEAN

It is very important to know whether, in order to preserve our teeth, we should avoid sugar, for all children like sugar and sweets, and if these things are good or them, yet bad for their teeth, we shall hardly know what we ought to do. It is true that the lactic acid made by microbes in our mouths, which is apt to dissolve the tooth-enamel, is made from sugar. One molecule of sugar is split up by microbes into two molecules of lactic acid.

But if we are careful about the cleanliness of our mouths, which is even more important than the cleanliness of the skin, we need not fear that our teeth will suffer, for the microbes that produce this change in sugar can only thrive in a mouth not kept clean.

People used to think, only fifty years ago, that sugar was not good for children, but a great Englishman, Herbert Spencer, was the first to argue that this opinion must be wrong. I fancy people thought that a child's liking for sweets and sugar was just greed, and they were the more sure of this because a child that has been deprived of sugar is sure to eat too many sweets, and may make itself ill when it gets the chance. But it is not likely that the answer can really be no, when we consider that every child likes sugar naturally. Perhaps Nature is not so foolish as we think in implanting this liking in children; perhaps it is we who are foolish in thinking Nature foolish.

THE CHILD'S APPETITE FOR SWEETS MAY BE THE SIGN OF WHAT IS GOOD FOR US

And now we know that sugar is one of the most valuable of all foods. All the starch that grown-up people consume—or children, though not little babies, for they cannot digest starch—is turned into sugar before it enters the blood, and more than half the total energy of the body is derived from the burning of sugar. Now, children need a great deal of energy supplied to them in their food, because they are very active, and because, being very small, they need to produce a lot of heat to keep them warm, as their small bodies very easily and quickly lose their heat. Therefore all children need a great deal of sugar, and a child's appetite for sweets and sugar is not a mistake made by Nature, nor a sign of greed in the child, but the proper sign and demand for what the child specially needs. People who believe this find that children who get what sugar they ask for do not take too much, are not greedy, but stop when they have had enough.

The next part of this is on page 2205.

A GLASS OF WATER

CONTINUED FROM 1972

"I AM so thirsty," says Janet; "please may I have a glass of water?" When she has emptied the tumbler someone says to her: "Where did that water come from?" "From the pump." "And where did the pump get it from?" "From the well." "And the well?" "From the earth." "And the earth?" "From the rain and the dew."

Janet takes an interest in Nature, and thinks about many simple things which stupid people overlook.

"That glass of water," someone tells her, "existed before there was a blade of grass and before there was a living creature on the earth. You have just drunk something that is older than everything else in the world. And it has lived through the whole history of the human race. Perhaps that very glass of water, when it was dew, moistened the eyelashes of Eve as she lay asleep in the Garden of Eden and softened the hot cheeks of Joan of Arc as she rushed into battle. Perhaps it glittered in the rainbow which rejoiced the eyes of Noah; perhaps Cleopatra shook it as dew to the earth in plucking a rose; perhaps it was part of the fog which confused the Spanish Armada; perhaps it was in the rivers of Babylon by which the children of Israel sat down and wept; perhaps it veiled the face of the sun when the Saviour was crucified; perhaps it rushed in fury over the decks of the Royal George; perhaps it drove Napoleon from Russia in that terrible snow which was so silent and so omnipotent; perhaps it was that very cup of water which Sir Philip Sydney refused when he saw a poor soldier whose need was greater than his; perhaps Nansen set foot upon it in the ice of the Polar regions; perhaps it moistened the lips of St. Paul, Boadicea, King Arthur, Shakespeare, Milton, Cromwell, Florence Nightingale.

"For it is eternal, dear Janet, that glass of water. Do you think it is yours for ever? No; you have only borrowed for a little while its cooling kindness. Look; I place a mirror to your lips. What do you see on the glass? That blur of vapour is the moisture of the water. Every breath you breathe gives back your glass of water to the air. The air converts it into dew and mist and fog, into rain and cloud and snow; it will fall in rain to the rivers, in snow upon the mountains, and the rivers will bear it to the seas; the seas will keep its salt and give back its pure moisture to the air; it will descend upon the meadows. it will plump the ears of corn which you will eat as bread, it will ripen your peaches, it will bring your daffodils to beauty, it will trickle through the soil to the springs, it will find its way to the wells, and perhaps you will drink that water a hundred times before you die."

"I am dreadfully thirsty," says Janet; "please may I have another glass? Perhaps I am drinking the very rain which prevented our picnic on Monday. I forgive it!"

HOW THE WATER COMES TO US

Few things are more familiar than the ordinary water-tap in the kitchen or bathroom, yet it is quite a wonderful story how the water that flows when we turn on the tap is brought from the distant hills into our homes. Here we see a fine mountain torrent, with the water foaming on its way down to the valley, and we shall endeavour to follow the course of this water until it is ready to rush forth from the tap in our kitchen.

Water, of course, always flows downwards from the high hills into the valleys, and the stream we see in this picture is on its way to the lower valleys, where it will become a river, flowing smooth and wide. So it would continue to flow until it lost itself in the sea, but that man by his ingenuity can capture it and make it flow as he wishes, and even force it to rise up as high as the tallest house that was ever built.

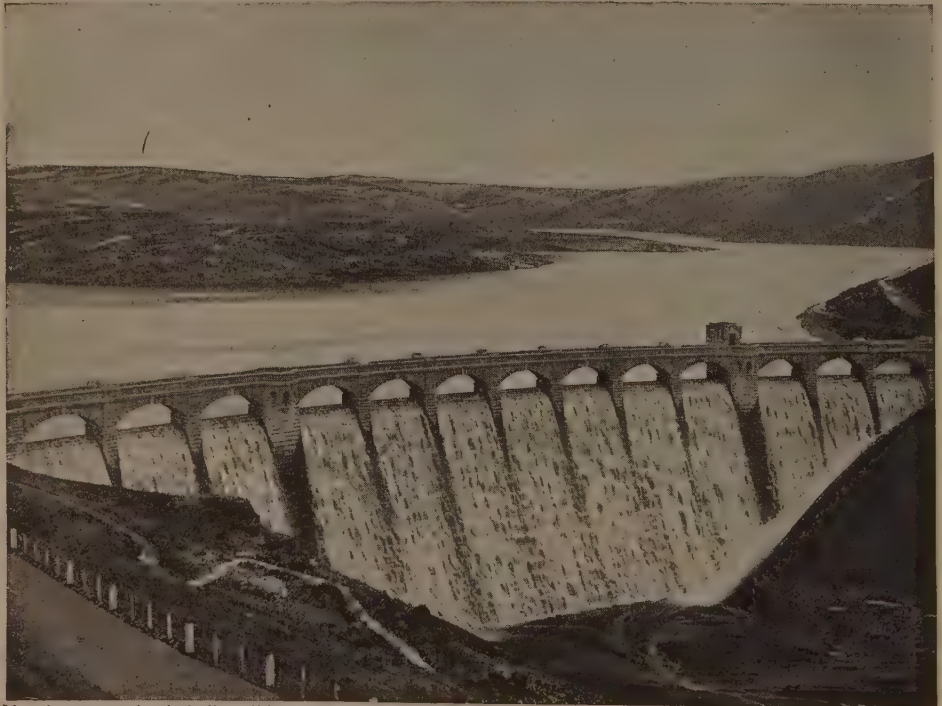
THE RIVER RUNNING INTO THE LAKE

The stream has now become a river, watering the fertile plain into which it has descended from the mountains in the distance. But before long man will step in with his wonderful works and stop its onward course, so that this continuous supply of clear, fresh water may not be wasted, but be turned into the service of the crowded cities.

Here we see the water no longer a stream, but lying wide and still throughout the whole length of another great valley. This is one of those natural bodies of water which we call lakes; but even a lake must have some outlet, for the river which runs in at one end must find its way out at the other, though it may do that by underground channels and not in any visible way. Here man begins his work to save the water for his use.

THE LAKE BECOMES A RESERVOIR

The first thing that man must do is to prevent the water that flows into the lake from flowing out again, and this he does by building a dam across the end, like that seen in the above picture. It is a long, slow, and very difficult undertaking, as the water has to be kept away from the dam while the dam is being built.



If a dam were simply built solid across the bottom of a lake, the pressure of the water would break it down in times of great flood, and to avoid this there are always spaces left, or gates that may be opened, so that when too much water collects in the lake it may run off as we see here. The lake has now become a reservoir.

THE GREAT PIPES THAT CARRY THE WATER

The next stage in the journey of the water from the mountain to the city takes it through great iron pipes from the main reservoir, illustrated on the last page, to the local reservoir, where it is ready for going into smaller pipes, and so to the houses. In this picture we see one of these great main pipes being drawn by the horses.

Here is a main pipe with water flowing through it as it arrives at one of the reservoirs. Sometimes, of course, great volumes of water will pour through like a perfect flood; but that depends on the amount of water that may be in the first main reservoir. From the main reservoir to the local reservoir may be a distance of many miles; and the main reservoir must be higher than the local reservoir, so that the water may flow continuously.

IMPRISONING THE RIVER IN THE EARTH

When we think that great pipes such as these must be laid underground, often over a distance of 30 or 40 miles, we can imagine how vast is the work of conducting water from its native mountains to the local reservoir.

CARRYING A RIVER ACROSS A RIVER

Not merely have the main pipes to be laid under the ground in deep and wide trenches, but there are, of course, rivers to be passed and valleys to be crossed, and over these or under them the pipes must go. Here we see a bridge being built across a river for no other purpose than to carry the water-main to the reservoir. The round tunnel on the far side of the unfinished bridge is the underground channel along which the water-pipe will go.

This picture shows us how the engineers carry the pipes across the bridge. We see them making first an immense arch of the water-pipes, and then a long bridge of them across a road and over a river, to bury them again in the ground; and so on, over all obstacles that stand in the way, until the locked-up river reaches the reservoir.

A WATER-WHEEL IN THE ISLE OF MAN

And after all, when the water has been brought quite near to the city where it is to be used for washing and drinking, it often happens that the houses in the city stand higher than the far-off lake from which the water has been brought all these weary miles. It is then necessary to erect pumping-engines, to force the water up into a reservoir higher than the houses, so that when the water flows out of it down into the ordinary pipes the pressure from the reservoir will force it up into the houses. This is one of the largest pumping-machines ever built, and it raises the water which would otherwise flood the lead-mines at Laxey, in the Isle of Man.

HOW THE WATER IS MADE PURE

The water, when it arrives in the local reservoir, is not, of course, perfectly clean and fit for drinking. It has to undergo the simple process known as "filtering," and there are different ways in which this may be done. Sometimes we see a large tower-like building known as the receiver, through which all the water flowing from the reservoir passes on its way out to the pipes of the town, and in passing through it is filtered by means of charcoal, which lets the water pass, but keeps back the particles of earth and other matter in the water.

More often there are large filtering-beds to be seen at the reservoirs, and here we see one of these empty. Charcoal is spread all over these beds, and the water is run into them and allowed to remain still until all the dirt in it has sunk to the bottom. Then it is run off and goes on its way to the town through the supply pipes.

LAYING THE WATER IN THE TOWN

The laying of the ordinary water-mains through the town is another great task. Let us suppose that a new reservoir has just been constructed in the scene of this picture. Along come the strong labourers with their picks and other tools for breaking up the earth. Here they are beginning the work.

Having broken up the ground, the men with their busy picks and shovels soon cut out the trench in which the water-pipe is to lie. This pipe is not so large as those carrying the water from the lake to the reservoir, and smaller pipes are laid from it into the houses, and smaller pipes still through the house to the tap.

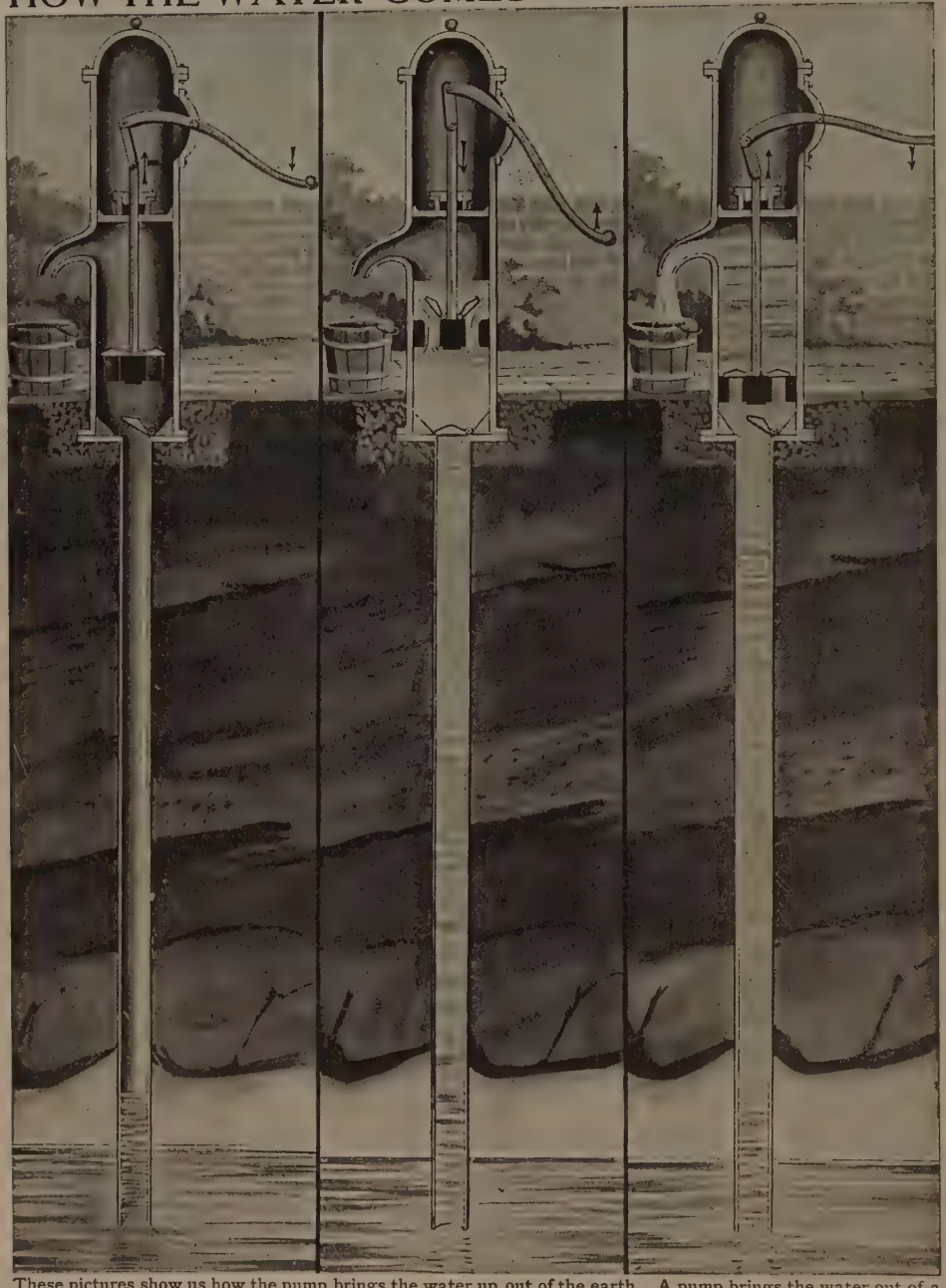
HOW A BOY TURNS ON THE RIVER

Here, flowing brightly from the tap, is the water which has made its long journey overground and underground, from mountain lake to the kitchen of our house, where a boy's fingers applied to the tap may control it at last.

There are, of course, many other ways of getting water, and in country villages, where it would be too expensive for the people to have a reservoir, they have to be content with sinking a well into the ground and letting down their buckets by a winding chain, as we see in this picture, and drawing them up again full of water.

The photographs on these pages are supplied by Messrs. Piggott & Sons, Birmingham, W. H. Knowles, and Valentine.

HOW THE WATER COMES OUT OF THE PUMP



These pictures show us how the pump brings the water up out of the earth. A pump brings the water out of a well in the same way as a boy brings water out of a glass by sucking a straw. The first picture shows the handle ready to be pressed down. When the handle is pressed the piston at the other end of it comes up, as shown by the arrow—which is put in each picture to show the way the handle moves. Underneath the pump is a pipe, reaching down into a well of water, and as the piston rises at the top the air in this pipe is sucked up and the water rushes up the pipe after it. The air rushing up the pipe opens a little valve at the top, through which the water follows it. The water has now reached the top of the pipe and rushes into the bottom of the pump, as in the second picture, and by moving the handle up and down the piston is pressed into the water and the two little valves in the piston are forced open. As the piston goes deeper into the water, the water rises through the open valves until it runs out of the spout. When the pump is still the water is kept down by the pressure of air in the pipe, and the effect of pumping is to draw air out of the pipe so that the water rushes to get out.

THE NEXT PICTURES OF FAMILIAR THINGS BEGIN ON PAGE 2237

MEN WHO FOUND ELECTRICITY

CONTINUED FROM 2000

ELECTRICITY is one of the most wonderful forces placed ready for the service of mankind, yet it is one of the things which hid its secret longest from us. Men discovered how to turn the strength of animals to account; how to make the winds drive our ships across the seas; how to apply the power stored up in coal; how to raise steam, and with it change the face of the world. Yet electricity is greater than these. It can do almost anything. It can light a city, supply power for lifting the heaviest weights, drive trains and trolleys, cook a dinner, heal a sick child, and kill us if we are not careful. It is in almost everything, though it does not move. All that we have to do is to excite it, to bring it out, then catch it, so that we may use it as we need it. It is so valuable and does such marvels that it is hard to believe that it existed for thousands of years in the earth and in the air quite unknown to men.

The very name of electricity tells a story of the mystery in which it was hidden for thousands of years from men. A great man named Thales, of whom we read in another part of this book, who lived nearly seven hundred years before Christ was born, noticed that amber, when rubbed with another material, became heated, and that when in that condition it would draw towards itself little pieces of feathers and other tiny light articles. It is said that in the old time the women of Syria used amber to catch up leaves, straws, and other things clinging to their clothes.

A great writer named Pliny, who was born in the year 62 A.D. and died about 114, wrote about amber and its ways. He likened it to the loadstone, the properties of which were well known in his day. We all know that the loadstone is a certain ore which, if allowed to hang by a string, always has one of its points towards the North Pole and the other towards the South Pole, and will attract other metals towards itself. Another thing that Pliny knew was that the electric fish can give such sharp electric shocks as to make a man quite ill. But he never thought that there was any connection between the power of the amber, the fish, and the loadstone.

It was not until the sixteenth century was well advanced that the world began to take a real interest in electricity. Then William Gilbert, a thoughtful scholar, who was one of Queen Elizabeth's doctors, set himself to make experiments with a number of substances to see whether they, like amber, would, when warmed by friction, attract other

bodies. He found that many, including sulphur, sealing-wax, gems, solid resin, rock-salt, and many other things, had the same power. They would attract metals, stones, earths, fluid, and even heavy smoke.

THE COLCHESTER MAN WHO GAVE ELECTRICITY ITS NAME

As the first man to examine the question, he had to find a name to describe the condition which he excited in these objects. Now, as amber was the first substance known to possess this power of attraction, and as the Greek name for amber is *elektron*, Dr. Gilbert gave the name *electricity* to the condition which heat and friction excited in the things he tried. He is called the father of electrical science. Gilbert lived sixty-three years, dying in 1603; and his life was very valuable to the world, for every year since he began his discoveries our store of learning concerning electricity has gone on increasing.

Gilbert was a Colchester man. He was followed by a famous Irishman, Robert Boyle, a son of the Earl of Cork. Boyle was born in Munster, in 1627, twenty-four years after the death of Gilbert. He was a wonderful scholar as a boy, and at ten learned algebra simply because he loved to exercise his mind. He invented a famous air-pump, and taught the world all about the condition and qualities of air. His work for electricity was to show that electricity remained for some time in a substance after rubbing had ceased; and to add new substances which could be electrified. The mere fact that he was noticing electricity was sufficient to set other men thinking about it, for his reputation was very high, especially with the great men on the Continent of Europe.

THE MAN WHO FASTENED TWO THINGS TOGETHER WITH NOTHING

Boyle died in 1691, five years after the death of Otto von Guericke. This clever man was born at Magdeburg, Prussia, in 1602, and after an excellent education visited England and became acquainted there with the scientists of that day. He invented the first air-pump, but that of Boyle's was so much better that the Prussian invention was soon forgotten. Guericke was the first man to show the immense power of a vacuum. He made two hemispheres of metal—that is, two large metal cups, the edges of which fitted together. There was a tap to each, through which the air could be drawn out by the air-pump. When this was done, so tightly did the two hemispheres cling together that not until the united strength of fifteen horses had been employed could they be pulled apart.

Guericke lived far too early. He discovered a way of making electric light, but nobody knew what it meant. Electric lighting did not become general until 1878. What Guericke did was to make a ball of sulphur inside a globe of glass, then break off the glass so as to expose the sulphur. This he rubbed in the dark, and found that it gave forth a light, accompanied by sound. He it was who discovered also that bodies which have not been electrified by friction become electrified when brought into contact with other bodies which have been electrified.

Sir Isaac Newton did one notable thing for electricity by showing that a disc of glass, when placed in a brass cylinder and electrified, would attract paper so strongly as to make it leap about in the cylinder.

THE MAN WHO SHOWED THAT THE ELECTRIC SPARK WAS LIKE LIGHTNING

Next came the experiments of Francis Hawksbee, who was famous in 1705 as a scientist, when he was elected a member of the Royal Society. It is not known when he was born, though the year of his death is given as about 1713. He made important experiments with air and mercury, and with a machine for producing electricity by rubbing a glass cylinder with the hand. He, for the first time, drew attention to the fact that the electric sparks which he was able to produce, and the crackling noise they made, resembled lightning. His son, Francis Hawksbee, who was born in 1687 and died in 1763, was a gifted maker of scientific instruments, and was the first man in London to lecture and at the same time make scientific experiments to illustrate his theories. The elder Hawksbee wrote much about his discoveries, and his books, translated into French and Italian, were of great assistance to scientists on the Continent.

All this may seem unimportant, but each of these little discoveries led to

other and more important discoveries. A tree in a forest may not seem of much use as a dwelling for a man, but when the tree-feller and the carpenter and the builder have each done their share, that tree becomes an essential part of a house, all the parts of which have been pieced together, just like the building up of a great science. Now we come to the first step which brings us nearer to practical uses of electricity.

Stephen Gray was a Bluecoat boy in London at the beginning of the eighteenth century, and by some happy chance gave up his life to the study of electricity. He made a grand discovery. He found that we can divide matter into two classes—that which can be electrified by friction, and that which cannot be electrified by friction. Then he went a step further and found that the non-electrics could be made electric by being placed in contact with those which were already electrified. This means, as we should say now, that he had discovered that some substances are conductors of electricity, and some are non-conductors of electricity.

THE BLUECOAT BOY WHO SENT ELECTRICITY ALONG A LINE OF THREAD

An ivory ball did not seem a promising thing with which to work, but Gray got a glass tube, and into its ends he fitted two corks. Into one cork he fixed his ivory ball, and, to his delight, he found that when the glass was rubbed it passed on its electricity through the cork to the ivory ball, and the ivory ball would now attract little light things just as the glass itself would. This led Gray to many splendid experiments—little in themselves, but dazzling by their results, considering how he was working in the dark. He tried if silk would conduct electricity, and found that it would not. So he tried pack-thread, and found that that did. He put up a line of pack-thread, and supported it by loops of silk, which would not conduct the current away from the cotton. He was able to send a current of electricity along his line of thread for a distance of 886 feet. That was a wonderful achievement.

An industrious Frenchman was at work on similar lines at this time. This was a man named Dufay, who, born in 1699, died when only forty years of age, in 1739, three years after Gray. Dufay went over Gray's experiments, and went beyond them. He found that glass tubes could be used to hold up the pack-thread, and he found, too, that by connecting himself with the electrified thread he himself became electrified, and that when another person touched him there was a crackling sound, accompanied by a spark. But the great thing which Dufay did was to find out that there are two kinds of electricity, what we now call *positive* and *negative*.

HOW MEN'S KNOWLEDGE OF ELECTRICITY BEGAN TO GROW

The two kinds exist in a substance, and are at rest until that body is rubbed. Thus two electrified silks will not come together, but silk and worsted will, though two electrified woollen threads will keep as far apart as possible. This is like the loadstone or magnet. That part of the loadstone which points to the north will drive away the north pole of another magnet; but will attract the other magnet's south pole, as if it loved it. North and south go together in the magnet, and opposite kinds go together in electricity.

Inventions now went forward rapidly. Machines were made for rubbing glass cylinders with cushions and other things, and they produced so much electricity that sparks could be formed which would set light to spirits, to wax, to pitch, and other things which were thoroughly heated by friction. The increase of knowledge was now turned to account in a new way. Several men saw that, if electricity could be so easily produced in the open air, it ought to be still stronger if produced in a vessel, away from the free air, where it could be kept and tapped as required, instead of being allowed to escape. This was near the middle of the eighteenth century.

THE SHOCK THAT SURPRISED THE PROFESSOR WITH A JAR OF WATER

A monk living abroad, a foreign inventor, and a professor named Muschenbrœk, of Leyden in Holland, each seem to have had the same idea about the same time, and the outcome was what is called the Leyden jar. The professor electrified some water in a bottle or jar, which was covered with a metal stopper, through the centre of which ran an iron rod. From this the electricity could be conducted as it was wanted. The professor made his discovery of the power of the

electricity by accident. Holding the jar in one hand, he chanced to touch the iron rod with the other hand, and received such a shock that he declared that he would not for the crown of France risk such another.

THE WONDERFUL THINGS SIR WILLIAM WATSON DID WITH TWO LEYDEN JARS

The Leyden jar, though first made in Holland, was made perfect in England by Sir William Watson, another genius of those early days. Watson was a poor tradesman's son, and was born in London, in 1715. Apprenticed to a chemist, he loved science, and when he had made enough money to live on he gave himself wholly to science. He improved the Leyden jar by covering it inside and out with tinfoil. This had important results. He used wires for carrying the current from one Leyden jar to another Leyden jar. Sending the current along the wire, he found that it gave a shock to the person holding the far end of the wire, two miles away, practically at the very instant at which it was released from the Leyden jar. This proved that the action of electricity is instantaneous—a most important thing, as it afterwards proved in telegraphy. More wonders Sir William did with the mysterious force. He electrified a piece of ice, and with that set fire to spirits. He did the same with a drop of water which had been electrified. He fired the gunpowder in a gun with an electric spark, and showed many powers of electricity which had never before been suspected.

By this time the world was getting to know a great many things that electricity could be made to do, but they still knew nothing of its nature.

BENJAMIN FRANKLIN, WHO HELPED TO FREE AMERICA & TO FIND ELECTRIC POWER

There was living in America one of the greatest men the world has seen, Benjamin Franklin, the man who first captured fire from the sky and brought it to the ground. He was born at Boston, Massachusetts, in 1706, and began his career, with very little schooling, in a small printing office of one of his brothers. He was very poor, but he had a splendid brain, and never troubled about being short of money. He educated himself entirely by his own efforts. He was first a printer, going to London to learn what he could there, then setting up in business for himself in Philadelphia. So famous did he become that he was chosen by his countrymen to go to England as their representative. War was about to break out between Great Britain and the American colonies, and he did all that he could to prevent it. Seeing that his efforts were hopeless, he returned to America, where he found that the war had already broken out. He became a leading member of the Government which helped to give America her freedom from British control, and then was sent to France as Ambassador to gain the support of that country against England. After all, he had the delight of opening the arrangements which led to peace between England and America. The last thing he did in public life was to make a prayer to the American Government against slavery in the United States. That prayer of his was not to be answered until many a year after he had been in the grave.

So much for his public life. The more important thing for us here, however, is what he did with electricity.

HOW BENJAMIN FRANKLIN SENT UP A KITE TO BRING THE LIGHTNING DOWN

In the midst of all his work he had time to study and make experiments, so that he was honoured all over the world for his knowledge about the tides and the weather, about colours, and, most of all, about electricity. He was one of the men who suspected that lightning and electricity are one and the same thing. But Franklin was not content to remain guessing; he put his belief to the proof. He made a kite of silk, and on the top of it he fixed a thin wire. He tied a string to the kite, but near his hand he attached a silk ribbon to the string, and where the string and ribbon joined he fixed a metal key. Then one day, when a thunderstorm broke over his home, he sent up his kite into a thundercloud, and waited in a doorway to watch the result.

He had printed a statement expressing the belief that everything that had been done with electricity was no more than was to be observed in lightning. Now had come the hour when he was to make his reputation as a scientist secure, or be laughed at by the whole world. He was very anxious as he stood and waited in the doorway with his son.

THE MAN WHO CAPTURED LIGHTNING

Benjamin Franklin was a young printer who educated himself and became so famous that when he died not only our own country, but also France, where he had been an ambassador, went into public mourning for him. In this picture we see Franklin experimenting with a kite, which he sent up into a thunderstorm to see if he could get an electric current from the storm down the string to the insulator which he held. He succeeded, thus proving that electricity is the same force as lightning, and he first showed the value of the lightning conductor.

The first thundercloud passed without any sign at all, and Franklin feared. A second came over the kite, and he now saw that little loose strands of the string stood out stiff and bristling. He put his finger towards them, and they were attracted towards it. He placed his finger on the key, and instantly he felt a shock and saw an electric spark. Rain fell now and wetted the string of the kite, and electricity ran down the moistened string, and was so abundant that he was able to fill his Leyden jar from the key.

He had proved that lightning is electricity. He made other trials, and found that some clouds are charged with positive electricity and some with negative electricity, exactly in the same way as in the electricity produced by different bodies on earth. No sooner had he made sure of his facts than he set to work and built lightning conductors. If lightning could be drawn from the skies, as his kite had shown that it could, then surely, he thought, it should be possible to guide into the ground the lightning, which, if left to strike freely, might destroy the house. It was in 1752 that Franklin made his great discovery. He lived for thirty-eight years afterwards, and when he died, in 1790, not only the whole of America, but the whole of France went into public mourning for him.

HENRY CAVENDISH

Discovery was now well on the way to practical success, and every year added surprises. John Canton, who was born at Stroud, in 1718, became a schoolmaster, and invented valuable electrical instruments. He was the first man to manufacture powerful artificial magnets, and discovered that the air of a room can be electrified just like so many other things. Baccaria, a celebrated Italian, found that the air surrounding an electrified body itself becomes electrified. Then Robert Symmer made the amusing discovery that silk stockings and worsted stockings, when warmed and rubbed together, become so electrified that a Leyden jar can be filled with the current from them. More important was the work of Henry Cavendish, the grandson of the second Duke of Devonshire, born at Nice, in 1731.

He was very rich, and very strange in his manner. He lived the life of a hermit in a beautiful London house. He hated the sight of strangers—not because he was an unkind man, but because he was so shy and modest. His female servants were never allowed to see him. If he had any orders for them he would write them down and leave a note on the hall table. Science was the great joy of his life. The chief thing that he did for electricity was to show that iron wire conducts electricity 400,000,000 times as well as water does. By the aid of electricity he exploded oxygen and hydrogen, and got pure water as the result. Cavendish lived until 1810, and in his time two men arose who quite changed the method of producing electricity. One was Luigi Galvani, who was born at Bologna, Italy, in 1737, and died there in 1798. The other and greater was Alessandro Volta, born in 1745, at Como, where he died in 1827.

Galvani, when experimenting with an electric machine, found that the legs of a dead frog were set to work by an electric shock. He determined to see if lightning would have the same effect; but while he was fixing the frog by a copper skewer to the iron railing of his balcony, he saw the twitching renewed the moment the copper touched the iron. Galvani declared that the electricity existed in the tissues of the frog. When Volta heard of this, he set to work to prove that the body of the frog did not contain the electricity. He argued that it was produced by the contact of two different metals, and he proved that he was right. He placed a disc of copper on his table, and on top of that he placed a piece of cloth which had been soaked in sulphuric acid and water. On top of that he placed a disc of zinc. Next he added copper, cloth, and zinc again, and so on, in that order, until he had built up a pile. It was a pile of pairs of zinc

and copper discs, each pair having a moist piece of cloth between. Then he fastened a wire to the zinc disc at the top of the pile, and a second wire to the copper disc at the bottom of the pile.

ALESSANDRO VOLTA, THE MAN WHO MADE THE ELECTRIC BELL RING

Volta put the free ends of the two wires together, then separated them. As they were drawn apart, the electric current which had been set up in the pile caused a spark at the ends of the wires. Here, then, was the first instance of the manufacture of electricty by chemical action.

It was easy soon to improve on the Voltaic pile. Instead of placing the discs and cloth on the table, for the moisture quickly to dry up, he put the pile into a jar, or cell, filled with the water and acid. That was the Voltaic cell, which to this day is used for producing electricity by chemical action. This invention belongs to the year 1800, but more than a century afterward we still sometimes use the Voltaic cell as the battery for our electric bells, and all manner of other things.

This invention caused much excitement, and set men still harder to work. They found now that they could produce electricity in this way as they liked, and cause it to flow in a steady current over wires, not letting it fly away immediately it was created as it did from amber and other things. They found, among other things, that the current would heat wires, and this led at once to Sir Humphry Davy's discovery of the electric flame from which we get electric light, as we read on page 657

THE DANISH PROFESSOR WHO TURNED THE COMPASS FROM THE NORTH

Now we must think for a moment of magnets. They had long been made. Soft iron could be magnetised by rubbing the loadstone upon it, but magnets like these soon lost their magnetism. Steel, after being magnetised by the loadstone, does not lose its magnetism. Once a magnet, always a magnet, with the hard steel. Now, many clever men had been wondering if there might not be some connection between magnetism and electricity, and Professor Oersted, a Danish scientist, living at Copenhagen, found, in 1820, that by passing an electric current from a Voltaic battery through a wire he could alter the position of the magnetic needle. The magnetic needle is the little steel pointer of the compass which, when not interfered with, points to the north. Oersted found that, though the whole earth is one vast magnet, its power to attract the magnetic needle to the north is not great enough to prevent the point of the needle from being drawn aside by a strong electric current. Oersted showed that when the wire bearing the electric current is placed over the needle, the needle turns it head from the north to the east, but that if the wire be placed underneath the needle, the needle turns its head to the west.

What Oersted did sounds an interesting trick for a conjurer to do, but see what the effect of it was. The fact that an electric current turns the magnet is the beginning of the power which enables us to have telegraphs and telephones, and to do all the work of which the marvellous electric current is capable. Oersted had opened the door to the great field of discovery in what we call electro-magnetism. But the discovery did not remain there, or it would have been of no use to mankind.

MICHAEL FARADAY, THE BLACKSMITH'S SON WHO HELPED TO CHANGE THE WORLD

It remained for one of the finest English sons of science to carry the work to perfection. This was Michael Faraday, who was born in 1791, the son of a poor London blacksmith. After very little schooling he was apprenticed to a bookbinder, and after working hard all day he would study science at night. One day a gentleman, on entering the shop, found the boy at work binding an encyclopædia, and studying hard at the article in it on electricity.

The gentleman was surprised to see a boy so interested in a subject of such difficulty, and questioned him. He found that Faraday, working late at night, had already been making experiments of his own, though he was too poor to possess anything but an old bottle for his battery. The visitor was so pleased that he gave him four tickets for the lectures which Sir Humphry Davy was then delivering at the Royal Institution. Faraday was as pleased as if anybody had given him

a fortune. He went to the lectures. He made notes of what he heard, and then at the end of the lectures he went, in fear and trembling, to the great man and showed him his notes.

Davy was surprised to see what the poor boy had done. But he remembered how poor he himself had been as a boy, and how he had had to struggle to educate himself, and his heart warmed towards the humble apprentice. Faraday told him that he wanted to be a scientist, and Davy, after doing all that he could to test his faith, had the boy appointed as his own assistant. He helped him in his education, he took him on the Continent and let him make numberless

Michael Faraday was a poor boy who taught himself and became one of the greatest scientists. In this picture we see him at work in the laboratory of the Royal Institution, where he made many of his wonderful discoveries

experiments, and in course of time, when Faraday had grown up and become famous for his work in science, he succeeded the great man who had been so good a friend to him.

Faraday's life was a long, beautiful story of good and wonderful achievements. He did more for scientific learning than any other man of his day. His lectures and writings were upon the most difficult subjects, yet he wrote and talked so simply that even children could understand him and find delight in his words. All that he did for science is too much for us to talk of here; but the thing which we have to note is one of his wonderful discoveries concerning electricity and magnetism. Oersted had found that the electric current will turn the magnetic needle. Faraday worked until he discovered that the magnet will electrify wire through which no current is passing! That clearly established the relationship between magnetism and electricity.

The result of this was of great importance. It meant that men no longer had to depend upon the small current of electricity which was chemically produced in the jars or batteries. First of all we have a coil of wire which, when electrified and placed near a magnet, itself becomes a magnet, with a north pole and a south pole, the north pole of the wire being attracted by the south pole of the magnet, and the south pole of the wire being attracted by the north pole of the magnet; while the north pole of the magnet drives away the north pole of the electrified wire, and the south pole of the magnet drives away the south pole of the wire. But we can make the north and south poles of the wire change places. If we send the current in by one end, then the front of the wire is the north pole; if we send the current in by the other end of the wire, then the back part of the wire becomes the north pole. The moment the current is turned off, or the connection broken, as we say, the

coil of wire ceases to be a magnet. William Sturgess, in 1825, made an electro-magnet of the highest value. He found that if we take a piece of soft iron and wrap wire about it, it becomes a far more powerful magnet, when electrified, than the ordinary magnet itself, and of course it can be made a magnet or not a magnet as often as we turn the current on or off. That gives us a powerful magnet which, as we have seen, can electrify any other coil of wire brought near it.

Faraday, working on, found that the coil of wire, on coming near the magnet, passed through what he called lines of force—certain avenues through which the magnetic influence is travelling. Therefore the more often that the coil passed through these lines of force the more often would it feel the effects. The next step, therefore, was to make a coil of wire which was attached at its ends to a revolving wheel. The coil, by turning round rapidly, received repeated impulses from the magnet. The current set up in this coil can be led away by wires into a receiver and stored, to be sent over wires hundreds or thousands of miles long, to do all manner of work, as often as it is wanted.

The use of the electro-magnet enables us to get force for driving engines, for telegraphing and telephoning, for lifting huge weights, and for all sorts of work. It is perfectly obedient, for the electric current which controls it can be turned on or off at any moment. The greatest part of the foundations of electric science had now been laid. All that remained was to apply to practical purposes the knowledge which these first workers had given the world.

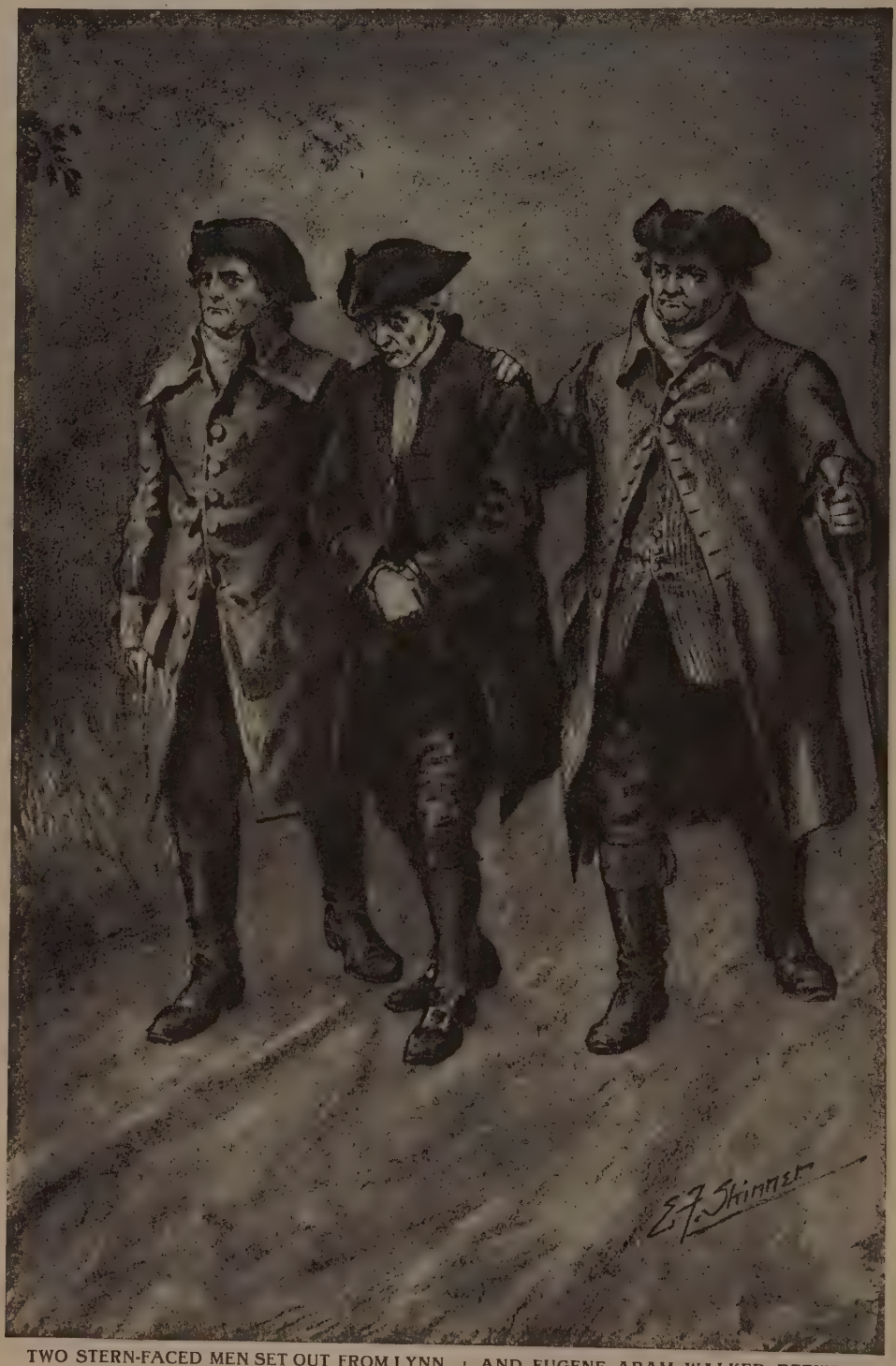
Long intervals passed before we could take advantage of all the theories. The electric telegraph dates from about 1837; the cables under the sea from 1852, electric bells from about 1855, the telephone and electric light from about 1878. It was possible by 1883 to produce electricity in sufficient quantities to sell it like gas to people who wished to use it. In the same year the first electric trolleys began to run, and electric railways appeared in 1892. Wireless telegraphy was known in its first stages long ago, but it was not until 1899 that it could be used. One of the most brilliant electricians was Lord Kelvin, who died only in 1907. He used to be Mr. William Thompson, but Queen Victoria honoured him by making him Lord Kelvin. We shall read more about him on another page.

So, from the rubbing of amber to make it attract chaff and pieces of straw, men got to friction machines and excited stockings; from that to the Leyden jar, and so on to the Voltaic pile and cell and battery; then on to the electro-magnet and the great dynamos, which use up the knowledge of the men who discovered electro-magnetism, and produce electricity enough to do half the work of the world.

This picture shows us a wonderful experiment which proved to men for the first time the immense pressure of the atmosphere. Otto von Guericke made two large metal cups with rims fitted against one another so closely that no air could get inside. He then pumped the air out with an air-pump so that there was practically nothing inside; the two cups then held together so that it took fifteen horses to pull them apart.

THE NEXT STORIES OF MEN AND WOMEN BEGIN ON PAGE 2307

EUGENE ARAM GOES TO HIS DOOM



TWO STERN-FACED MEN SET OUT FROM LYNN,
THROUGH THE COLD AND HEAVY MIST;
AND EUGENE ARAM WALKED BETWEEN
WITH GYVES UPON HIS WRIST.

A DRAMATIC POEM BY THOMAS HOOD

IN the year 1745 a Yorkshire schoolmaster named Eugene Aram killed a man to gain his goods. He was tried for murder, but was not convicted. Fourteen years later the body of his victim was found, and he was tried again and condemned to death. Aram was a very clever man, a fine scholar, and not at all the kind of person one would suspect of so terrible a crime. The story of his dream is fiction; but in this great poem by Thomas Hood we see how consciousness of guilt may work upon the human mind and become the very agent of justice.

THE DREAM OF EUGENE ARAM

CONTINUED FROM 2006

'Twas in the prime
  of summer time,
An evening calm and
  cool,
And four-and-twenty happy boys
  Came bounding out of school:
There were some that ran, and some
  that leapt,
Like troutlets in a pool.

Away they sped with gamesome minds,
  And souls untouched by sin;
To a level mead they came, and there
  They drave the wickets in:
Pleasantly shone the setting sun
  Over the town of Lynn.

Like sportive deer they coursed about,
  And shouted as they ran—
Turning to mirth all things of earth,
  As only boyhood can:
But the usher sat remote from all,
  A melancholy man!

His hat was off, his vest apart,
  To catch heaven's blessed breeze;
For a burning thought was in his brow,
  And his bosom ill at ease:
So he leaned his head on his hands, and
  read
  The book between his knees!

Leaf after leaf he turned it o'er,
  Nor ever glanced aside;
For the peace of his soul he read that
  book
  In the golden eventide;
Much study had made him very lean,
  And pale, and leaden-eyed.

At last he shut the ponderous tome;
  With a fast and fervent grasp
He strained the dusky covers close,
  And fixed the brazen hasp:
"O God, could I so close my mind,
  And clasp it with a clasp!"

Then leaping on his feet upright,
  Some moody turns he took;
Now up the mead, then down the mead,
  And past a shady nook:
And lo! he saw a little boy
  That pored upon a book!

"My gentle lad, what is't you read—
  Romance or fairy fable?
Or is it some historic page,
  Of kings and crowns unstable?"
The young boy gave an upward glance—
  "It is the death of Abel."

The usher took six hasty
  strides,
As smit with sudden
  pain;
Six hasty strides beyond the
  place,
Then slowly back again:
And down he sat beside the lad,
  And talked with him of Cain.

And, long since then, of bloody men,
  Whose deeds tradition saves;
Of lonely folk cut off unseen,
  And hid in sudden graves;
Of horrid stabs, in groves forlorn,
  And murders done in caves.

And how the sprites of injured men
  Shriek upward from the sod—
Ay, how the ghostly hand will point
  To show the burial clod;
And unknown facts of guilty acts
  Are seen in dreams from God!

He told how murderers walked the
  earth
  Beneath the curse of Cain—
With crimson clouds before their eyes,
  And flames about their brain:
For blood has left upon their souls
  Its everlasting stain!

"And well," quoth he, "I know for truth,
  Their pangs must be extreme—
Woe, woe, unutterable woe—
  Who spill life's sacred stream!
For why? Methought last night I
  wrought
  A murder in a dream!

"One that had never done me wrong—
  A feeble man, and old;
I led him to a lonely field,
  The moon shone clear and cold:
Now here, said I, this man shall die,
  And I will have his gold!

"Two sudden blows with a ragged stick,
  And one with a heavy stone,
One hurried gash with a hasty knife—
  And then the deed was done:
There was nothing lying at my foot
  But lifeless flesh and bone!

"Nothing but lifeless flesh and bone,
  That could not do me ill;
And yet I feared him all the more,
  For lying there so still:
There was a manhood in his look,
  That murder could not kill!

" And lo ! the universal air
Seemed lit with ghastly flame—
Ten thousand thousand dreadful eyes
Were looking down in blame :
I took the dead man by the hand,
And called upon his name.

" Oh, God ! it made me quake to see
Such scenes within the slain !
But when I touched the lifeless clay,
The blood gushed out amain !
For every clot, a burning spot
Was scorching in my brain !

" My head was like an ardent coal,
My heart as solid ice ;
My wretched, wretched soul, I knew,
Was at the devil's price :
A dozen times I groaned, the dead
Had never groaned but twice ;

" And now from forth the frowning sky,
From the heaven's topmost height,
I heard a voice—the awful voice,
Of the blood-avenging Sprite :
' Thou guilty man ! take up thy dead,
And hide it from my sight.'

" I took the dreary body up,
And cast it in a stream—
A sluggish water black as ink,
The depth was so extreme.
My gentle boy, remember this
Is nothing but a dream !

" Down went the corpse with a hollow plunge,
And vanished in the pool ;
Anon I cleansed my bloody hands,
And washed my forehead cool,
And sat among the urchins young
That evening in the school !

" Oh, Heaven ! to think of their white souls,
And mine so black and grim !
I could not share in childish prayer,
Nor join in evening hymn :
Like a devil of the pit I seemed,
'Mid holy cherubim !

" And peace went with them one and all,
And each calm pillow spread,
But guilt was my grim chamberlain
That lighted me to bed,
And drew my midnight curtains round,
With fingers bloody red !

" All night I lay in agony,
In anguish dark and deep ;
My fevered eyes I dare not close,
But stared aghast at sleep ;
For sin had rendered unto her
The keys of hell to keep !

" All night I lay in agony,
From weary chime to chime,
With one besetting horrid hint,
That racked me all the time—
A mighty yearning like the first
Fierce impulse unto crime !

" One stern, tyrannic thought, that made
All other thoughts its slave ;
Stronger and stronger every pulse
Did that temptation crave—
Still urging me to go and see
The dead man in his grave !

" Heavily I rose up—as soon
As light was in the sky—
And sought the black accursed pool
With a wild misgiving eye ;
And I saw the dead in the river bed,
For the faithless stream was dry !

" Merrily rose the lark, and shook
The dewdrop from its wing ;
But I never marked its morning flight,
I never heard it sing :
For I was stooping once again
Under the horrid thing.

" With breathless speed, like a soul in chase,
I took him up and ran—
There was no time to dig a grave
Before the day began ;
In a lonesome wood, with heaps of leaves,
I hid the murdered man ;

" And all that day I read in school,
But my thought was other-where !
As soon as the midday task was done
In secret I was there ;
And a mighty wind had swept the leaves,
And still the corse was bare !

" Then down I cast me on my face,
And first began to weep,
For I knew my secret then was one
That earth refused to keep ;
Or land or sea, though he should be
Ten thousand fathoms deep !

" So wills the fierce avenging Sprite,
Till blood for blood atones !
Ay, though he's buried in a cave,
And trodden down with stones,
And years have rotted off his flesh—
The world shall see his bones !

" Oh, God, that horrid, horrid dream
Besets me now awake !
Again—again, with a dizzy brain
The human life I take ;
And my red right hand grows raging hot,
Like Cranmer's at the stake.

" And still no peace for the restless clay
Will wave or mould allow.
The horrid thing pursues my soul—
It stands before me now ! "
The fearful boy looked up, and saw
Huge drops upon his brow !

That very night, while gentle sleep
The urchin's eyelids kissed,
Two stern-faced men set out from Lynn,
Through the cold and heavy mist ;
And Eugene Aram walked between
With gyves upon his wrist.

FAIR DAFFODILS

Robert Herrick, the writer of this charming song about the daffodils, was a clergyman who lived from 1591 to 1674, and wrote an immense amount of poetry, many of his poems taking rank among the most beautiful in our language.

FAIR daffodils, we weep to see
You haste away so soon ;
As yet the early-rising sun
Has not attain'd his noon.
Stay, stay,
Until the hasting day
Has run
But to the even-song ;
And, having pray'd together, we
Will go with you along.

We have short time to stay as you,
We have as short a spring ;
As quick a growth to meet decay
As you, or any thing.
We die,
As your hours do, and dry
Away
Like to the Summer's rain ;
Or as the pearls of morning's dew,
Ne'er to be found again.

THE INCHCAPE ROCK

This fine poem by Robert Southey describes with great dramatic effect an old story of the east coast of Scotland which may possibly have been true. The Inchcape Rock, from which Ralph the Rover is supposed to have cut the bell, stands twelve miles out from the coast of Scotland. The poem is, of course, intended to show that an evil deed will recoil on the head of the offender.

NO stir in the air, no stir in the sea,
The ship was as still as she could be ;
Her sails from heaven received no motion,
Her keel was steady in the ocean.

Without either sign or sound of their shock
The waves flow'd over the Inchcape Rock ;
So little they rose, so little they fell,
They did not move the Inchcape Bell.

The good old Abbot of Aberbrothok
Had placed that bell on the Inchcape Rock ;
On a buoy in the storm it floated and swung,
And over the waves its warning rung.

When the rock was hid by the surges' swell,
The Mariners heard the warning bell ;
And then they knew the perilous Rock,
And blest the Abbot of Aberbrothok.

The sun in heaven was shining gay,
All things were joyful on that day ;
The sea-birds scream'd as they wheel'd round,
And there was joyance in their sound.

The buoy of the Inchcape Bell was seen
A darker speck on the ocean green ;
Sir Ralph the Rover walk'd his deck,
And he fixed his eye on the darker speck.

He felt the cheering power of spring,
It made him whistle, it made him sing ;
His heart was mirthful to excess,
But the Rover's mirth was wickedness.

His eye was on the Inchcape float ;
Quoth he, "My men, put out the boat,
And row me to the Inchcape Rock,
And I'll plague the priest of Aberbrothok."

The boat is lower'd, the boatmen row,
And to the Inchcape Rock they go ;
Sir Ralph bent over from the boat,
And he cut the bell from the Inchcape float.

Down sunk the bell, with a gurgling sound,
The bubbles rose and burst around ;
Quoth Sir Ralph, "The next who comes to the Rock
Won't bless the Abbot of Aberbrothok."

Sir Ralph the Rover sail'd away,
He scour'd the seas for many a day ;
And now grown rich with plunder'd store,
He steers his course for Scotland's shore.

So thick a haze o'erspreads the sky
They cannot see the sun on high ;
The wind hath blown a gale all day,
At evening it hath died away.

On the deck the Rover takes his stand,
So dark it is they see no land.
Quoth Sir Ralph, "It will be lighter soon,
For there is the dawn of the rising moon."

"Canst hear," said one, "the breakers roar ?
For methinks we should be near the shore ;
Now where we are I cannot tell,
But I wish I could hear the Inchcape Bell."

They hear no sound, the swell is strong ;
Though the wind hath fallen, they drift along,
Till the vessel strikes with a shivering shock :
Cried they, "It is the Inchcape Rock !"

Sir Ralph the Rover tore his hair,
He curst himself in his despair ;
The waves rush in on every side,
The ship is sinking beneath the tide.

But even in his dying fear
One dreadful sound could the Rover hear,
A sound as if with the Inchcape Bell,
The fiends below were ringing his knell.

THE TRAVELLER'S RETURN

Robert Southey here describes without exaggeration the purest and most delightful of all the human affections : the joy which comes when we return from a journey to the companionship of those we love beneath the roof of our own home.

SWEET to the morning traveller
The song amid the sky,
Where, twinkling in the dewy light,
The skylark soars on high.

And cheering to the traveller
The gales that round him play,
When faint and heavily he drags
Along his noontide way.

And when beneath the unclouded sun
Full wearily toils he,
The flowing water makes to him
A soothing melody.

And when the evening light decays,
And all is calm around,
There is sweet music to his ear
In the distant sheep-bell's sound.

But O ! of all delightful sounds
Of evening or of morn,
The sweetest is the voice of love
That welcomes his return.

* WISHING

There is wise advice in these verses by Ella Wheeler Wilcox, for it is true that no amount of wishing will avail us anything if our wishes are not followed up by serious endeavour.

Do you wish the world were better?
Let me tell you what to do:
Set a watch upon your actions,
Keep them always straight and true;
Rid your mind of selfish motives,
Let your thoughts be clean and high.
You can make a little Eden
Of the sphere you occupy.

Do you wish the world were wiser?
Well, suppose you make a start
By accumulating wisdom
In the scrapbook of your heart.
Do not waste one page on folly;
Live to learn, and learn to live.
If you want to give men knowledge,
You must get it, ere you give.

Do you wish the world were happy?
Then remember day by day
Just to scatter seeds of kindness
As you pass along the way;
For the pleasures of the many
May be ofttimes traced to one,
As the hand that plants an acorn
Shelters armies from the sun.

THE DOG AND THE WATER-LILY

William Cowper, like most poets, was a great lover of animals, and among the many poems in praise of man's true friend, the dog, this by him deserves a high place.

The noon was shady, and soft airs
Swept Ouse's silent tide,
When, 'scaped from literary cares,
I wander'd on his side.

My spaniel, prettiest of his race,
And high in pedigree
(Two nymphs adorn'd with every grace
That spaniel found for me),

Now wanton'd lost in flags and reeds,
Now starting into sight,
Pursued the swallow o'er the meads
With scarce a slower flight.

It was the time when Ouse display'd
His lilies newly blown;
Their beauties I intent survey'd,
And one I wish'd my own.

With cane extended far I sought
To steer it close to land;
But still the prize, though nearly caught,
Escaped my eager hand.

Beau mark'd my unsuccessful pains
With fix'd considerate face,
And puzzling set his puppy brains
To comprehend the case.

But with a cherup clear and strong
Dispersing all his dream,
I thence withdrew, and follow'd long
The windings of the stream.

My ramble ended, I return'd;
Beau, trotting far before,
The floating wreath again discern'd,
And plunging left the shore.

I saw him with that lily cropp'd
Impatient swim to meet
My quick approach, and soon he dropp'd
The treasure at my feet.

Charm'd with the sight, "The world," I cried,
"Shall hear of this thy deed;
My dog shall mortify the pride
Of man's superior breed;

"But chief myself I will enjoin
Awake at duty's call,
To show a love as prompt as thine
To Him Who gives me all."

THE CHILD AND THE SNAKE

This is one of the many poems for children written by Charles and Mary Lamb, and is most likely the work of the latter, judging by the very simple verse. The story which it tells is believed to have been founded on fact.

Henry was every morning fed
With a full mess of milk and bread.
One day the boy his breakfast took,
And ate it by a purling brook.
His mother lets him have his way.
With free leave Henry every day
Thither repairs, until she heard
Him talking of a fine *gray bird.*
This pretty bird, he said, indeed,
Came every day with him to feed;
And it loved him and loved his milk,
And it was smooth and soft like silk.
On the next morn she follows Harry,
And carefully she sees him carry
Through the long grass his heap'd-up mess;
What was her terror and distress
When she saw the infant take
His bread and milk close to a snake!
Upon the grass he spreads his feast,
And sits down by his frightful guest,
Who had waited for the treat;
And now they both began to eat.
Fond mother! shriek not, Oh, beware
The least small noise, Oh, have a care—
The least small noise that may be made
The wily snake will be afraid—
If he hear the slightest sound,
He will inflict th' envenom'd wound.
She speaks not, moves not, scarce does breathe,
As she stands the trees beneath.
No sound she utters; and she soon
Sees the child lift up his spoon,
And tap the snake upon the head,
Fearless of harm; and then he said,
As speaking to familiar mate:
"Keep on your own side, do, Gray Pate."
The snake then to the other side,
As one rebuked, seems to glide;
And now again advancing nigh,
Again she hears the infant cry,
Tapping the snake: "Keep further, do;
Mind, Gray Pate, what I say to you."
The danger's o'er! she sees the boy
(Oh, what a change from fear to joy!)
Rise and bid the snake "Good-bye";
Says he, "Our breakfast's done, and I
Will come again to-morrow day"—
Then, lightly tripping, ran away.

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THE VISION OF BELSHAZZAR

The great poet Lord Byron wrote many fine poems in which he told over again with all the splendid effect of his vigorous and directly moving verse the old stories of the Bible. In the following we have the fifth chapter of the Book of Daniel compressed into six verses of poetry, full of colour and dramatic power. It would be helpful to read the chapter of the Bible along with the poem here given.

THE King was on his throne,
The Satraps throng'd the hall;
A thousand bright lamps shone
O'er that high festival.
A thousand cups of gold,
In Judah deem'd divine—
Jehovah's vessels hold
The godless Heathen's wine.

In that same hour and hall
The fingers of a Hand
Came forth against the wall,
And wrote as if on sand:
The fingers of a man—
A solitary hand
Along the letters ran,
And traced them like a wand.

The monarch saw and shook,
And bade no more rejoice;
All bloodless wax'd his look,
And tremulous his voice:
"Let the men of lore appear,
The wisest of the earth,
And expound the words of fear,
Which mar our royal mirth."

Chaldea's seers are good,
But here they have no skill;
And the unknown letters stood
Untold and awful still.
And Babel's men of age
Are wise and deep in lore;
But now they were not sage,
They saw—but knew no more.

A captive in the land,
A stranger and a youth,
He heard the King's command,
He saw the writing's truth.
The lamps around were bright,
The prophecy in view;
He read it on that night—
The morrow proved it true!

"Belshazzar's grave is made,
His kingdom pass'd away,
He, in the balance weigh'd,
Is light and worthless clay;
The shroud, his robe of state,
His canopy, the stone;
The Mede is at his gate!
The Persian on his throne!"

TO THE SKYLARK

One of the many poems in which William Wordsworth describes with so much truth and loving observation the characteristics of the wild creatures of our land.

ETHEREAL minstrel! pilgrim of the sky!
Dost thou despise the earth where cares abound?
Or while the wings aspire, are heart and eye
Both with thy nest upon the dewy ground?
Thy nest which thou canst drop into at will,
Those quivering wings composed, that music still!

To the last point of vision, and beyond,
Mount, daring warbler! that love-prompted strain
'Twixt thee and thine a never-failing bond—
Thrills not the less the bosom of the plain:
Yet mightst thou seem, proud privilege! to sing
All independent of the leafy spring.

Leave to the nightingale her shady wood;
A privacy of glorious light is thine,
Whence thou dost pour upon the world a flood
Of harmony, with instinct more divine;
Type of the wise, who soar, but never roam—
True to the kindred points of Heaven and home.

EPITAPH ON A HARE

How fortunate was the lot of this hare which came into the gentle keeping of the poet William Cowper compared with the fate of so many of its race! Still, it would not be possible for all the members of the great hare family to lead such pleasant lives as the poet's pet; and while such tender sentiment as Cowper awakens in us by poems like this is of incalculable value in softening our character, we must not let it carry us into false views of the wild life of Nature.

HERE lies whom hound did ne'er pursue,
Nor swifter greyhound follow,
Whose foot ne'er tainted morning dew,
Nor ear heard huntsman's hallo!

Old Tiney, surliest of his kind,
Who, nurs'd with tender care,
And to domestic bounds confined,
Was still a wild Jack-hare.

Though duly from my hand he took
His pittance every night,
He did it with a jealous look,
And, when he could, would bite.

His diet was of wheaten bread,
And milk, and oats, and straw;
Thistles, or lettuces instead,
With sand to scour his maw.

On twigs of hawthorn he regaled,
On pippin's russet peel,
And when his juicy salads failed,
Sliced carrot pleased him well.

A Turkey carpet was his lawn,
Whereon he loved to bound,
To skip and gambol like a fawn,
And swing himself around.

His frisking was at evening hours,
For then he lost his fear,
But most before approaching showers,
Or when a storm drew near.

Eight years and five round rolling moons
He thus saw steal away,
Dozing out all his idle noons,
And every night at play.

I kept him for his humours' sake,
For he would oft beguile
My heart of thoughts that made it ache,
And force me to a smile.

But now, beneath this walnut shade,
He finds his long last home,
And waits, in snug concealment laid,
Till gentler Puss shall come.

He, still more aged, feels the shocks
From which no care can save,
And, partner once of Tiney's box,
Must soon partake his grave.

LITTLE VERSES FOR VERY LITTLE PEOPLE

OLD Abram Brown is dead and gone,
You'll never see him more;
He used to wear a long brown coat,
That button'd down before.

YOU shall have an apple,
You shall have a plum;
You shall have a rattle-basket,
When your dad comes home.

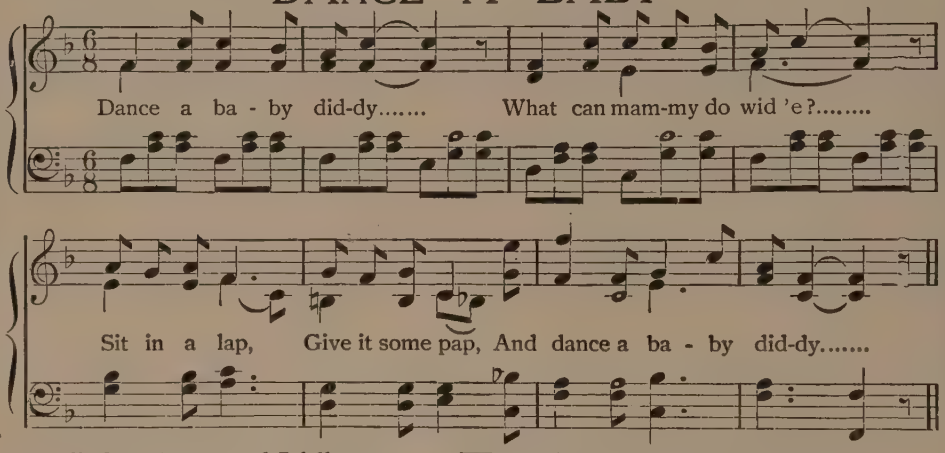
I'LL sing you a song,
Though not very long,
Yet I think it as pretty as any.
Put your hand in your purse,
You'll never be worse,
And give the poor singer a penny.

THE cock doth crow,
To let you know,
If you be wise,
'Tis time to rise.

THE man in the moon
Came tumbling down,
And asked his way to Norwich;
He went by the south,
And burnt his mouth,
With supping cold pease-porridge.

IF ifs and ans
Were pots and pans,
There would be no need for tinkers!

DANCE A BABY



MY little old man and I fell out;
I'll tell you what 'twas all about:
I had money and he had none,
And that's the way the noise begun.

THE King of France went up the hill,
With twenty thousand men;
The King of France came down the hill,
And ne'er went up again.

THERE was a little boy and a little girl,
Lived in an alley;
Says the little boy to the little girl,
"Shall I, oh, shall I?"

Says the little girl to the little boy,
"What shall we do?"
Says the little boy to the little girl,
"I will kiss you!"

WHEN little Fred was called to bed,
He always acted right;
He kissed Mamma, and then Papa,
And wished them all good-night.

He made no noise, like naughty boys,
But gently upstairs
Directly went, when he was sent,
And always said his prayers.

A SUNSHINY shower
Won't last half an hour.

AS the days lengthen,
So the storms strengthen.

A BAROMETER A BOY CAN MAKE

THE manufacture of the barometers that we see hanging in the halls of houses and in the windows of the shops where they are sold is beyond the abilities of the schoolboy. But any boy can, by following the instructions on this page, make a barometer that will serve the purpose and will illustrate the principle of the factory-made or shop-made barometers.

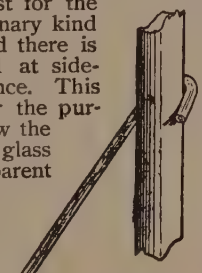
CONTINUED FROM 2042

The first thing we need is a piece of glass tubing. It should be forty-two inches long and its inside diameter should be a quarter of an inch, so that outside it should be three-eighths of an inch in diameter or a little more. There is more than one kind of glass tubing, and we must get the kind that is best for the purpose. There is an ordinary kind which we should not use, and there is a kind which, when looked at sideways, has a greenish appearance. This greenish kind is the best for the purpose. We might as well know the reason why the greenish glass is better. The pure, transparent glass owes its transparency to a substance called oxide of lead. If we fill such a tube with mercury, the mercury draws out the oxide of lead from the glass and forms a substance that sticks to the inside of the tube and prevents the mercury moving up and down.

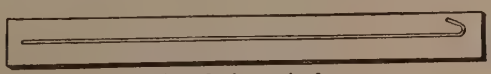
1. Closing the end of the barometer tube

The first thing we do with our glass tube is to wash it in warm water. Pour the warm water through it until it is quite clean. If it is very dirty it may be necessary to put a string through the tube, and then to tie a piece of cloth to one end of the string and pull the cloth right through the tube with the string. After the tube is clean we must dry it. We do this by tying to a piece of string a piece of clean, soft linen cloth, such as a piece of an old handkerchief, then putting the other end of the string through the tube and pulling the cloth right through. This may be done a few times to get the tube quite dry.

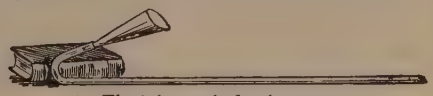
Now we take the tube and put it into a gas-flame, letting the flame heat it about two inches from one end as shown in picture 1. This end we had better hold with a pair of pliers. The best kind of pliers for the purpose is that with round ends, or "noses," as they are called. The end should be thin enough to go inside the tube. When we find that the gas-flame has softened the tube at the place where it has been, we pull the two ends of the tube apart, gently turning it round a little as we do so. We find that we pull the tube into two pieces and that each end has a long tail. We can throw away the small piece of tube, but we have not yet finished with the long piece. We must get rid of the long, thin end, and at the same time leave the tube closed at the end instead of open as formerly. Therefore we again heat the end of the tube, turning it round as we do so, and, with the help of the pliers or any convenient metal instrument, tap the end until we make a neat end as nearly round as possible and without the long, thin part. This part of the work requires a little care, as we must not burn our hands or clothes, but is not at all difficult to do.



2. Bending the tube



3. Position of tube on the frame



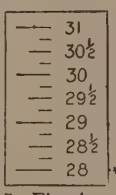
4. The tube ready for the mercury

We will suppose that we have now got the tube with one end closed and rounded. The next thing to do is to make a bend near the other end. This bend must be a gradual curve just as if the tube were bent round a wheel one and a quarter inches in diameter. In fact we may use a piece of wood or metal of this diameter to assist us in making the bend as seen in picture 2. We measure the tube thirty-six inches from the end that we have sealed up, and heat it in the gas-flame at this place. As it becomes a little soft, but not quite so soft as we made the other end, we bend it round a little, then heat it again and bend it again until we have the lower or short end almost, but not quite, parallel with the long part of the tube.

5. Wooden clip

6. Clip in position

The tube is now made, and we can now make the wood back upon which we will mount the tube. Get a piece of wood forty inches long, four inches wide, and about half an inch thick. Now get another piece of wood the same size, but only a quarter of an inch thick. Plane the wood all round until it is nice and smooth. Now lay the glass tube upon the thinner piece of wood in the position shown in picture 3 and mark round it carefully with a pencil. Cut out with a chisel the wood we have marked, and then nail the thin piece of wood to the thicker piece, taking care to keep the edges in line. We now have a board with a recess that fits the tube, and in which the tube may be fixed when we have filled it with mercury.



7. Figuring

8. Wording

The next part of our work is to fill the tube with mercury. The mercury should be as nearly pure as possible. We can easily tell if it is pure by pouring a little of it on a clean plate and moving the plate, so that the mercury runs about. If it breaks up into small round drops which run together readily and leave no stain on the plate, the mercury is pure and may be used. If, however, the drops into which the mercury breaks up are not round, but pear-shaped, running into each other with difficulty, or if they leave a stain on the plate, the mercury is not pure and should not be used.

Even if the mercury is pure we should strain it so as to take out any solid foreign matter that may be mixed with it. Take a glass tumbler and a piece of chamois leather. Pierce the leather with small pinholes and then place it over the mouth of the tumbler, pressing it down in the middle. Pour the mercury on to the leather; it will run through the pinholes into the tumbler, leaving any foreign matter on the leather.

Now we have to fill the tube with the mercury. The tube should be laid flat with the lower end upwards, and supported in this position by something such as a book, as seen in picture 4. We can see the reason why we did not bend over the lower end to be exactly parallel with the main stem; if we had done so, it would have been more difficult to pour in the mercury.

We shall want a little filler to enable us to pour in the mercury. We can easily make this filler with a piece of paper. Take a half-sheet of notepaper that is very stiff. Fold it over into a cone-shape with a tiny hole at the top of the cone. The hole should be small enough to enable the end to go into the tube a little way. With gum or seccotine fix the edges of the filler so that it will not come apart in use. In pouring in the mercury, prop up the short end of the tube as seen in picture 4, with the left hand hold the filler with its nose in the tube, and pour the mercury in a thin stream into the filler. Do this until the mercury is within one inch of the open mouth of the tube. At intervals during the process agitate the tube a little; this will make any air-bubbles escape.

Place a cup or a saucer on the table and lift the tube erect over it. The mercury will overflow through the lower end of the tube and the cup or saucer will catch it. Then put the end of a penholder or any other round piece of wood into the tube a little way, so as to make the mercury overflow more until about one and a half inches from the top of the tube are empty.

The tube may now be placed in the wooden frame we prepared for it, and we must put over the front of the tube, in about three places, clips to keep it in place. We could have these clips of brass or tin, but we can make wooden clips more easily. They should be made the whole width of the frame. Picture 5 shows one of the clips, and picture 6 shows part of the board with one clip in position. We must be careful not to split the wood when we nail them on. The holes through which the nails are put should be made with a small brad-awl if we would avoid splitting the wood.

9. Completed barometer

The only thing to do now is to mark the inches on the frame by the side of the tube. Take a piece of card, four inches long and one and a half inches wide. Cut it neatly square and mark it like picture 7. The distance between 29 and 30 is one inch, and from 30 to 31 it is one inch. Take another card the same size and mark it with wording as in picture 8.

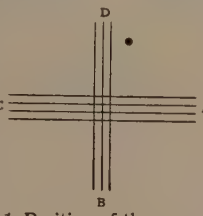
We have now to attach these cards to the frame at the side of the tube. Look at another barometer that is in good working order. The dial is marked in inches. To whatever mark the dial hand points, fix the card to the frame with that mark opposite the level of the mercury near the top of the tube. Put the other card on the opposite side of the tube, as seen in picture 9, and the barometer may be considered complete. But it will improve the appearance and keep dust from the tube if we put a glass front on it. This may be done by making and nailing to the edges of the top, bottom, and sides of the frame suitable pieces to hold the glass.

A DOLL'S CHRISTMAS HAMPER

WHILE we are enjoying the good things that Christmas brings, we surely must not forget our dolls. Here we are going to learn how to make a little doll's hamper, and later on to fill it with Christmas "goodies" which we shall find it quite easy to model with our fingers out of clay.

First, then, we will make the hamper, for which we must carefully measure off seven pieces of "No. 4" (or fairly thick) cane. Most of the big toy-shops sell cane for cane-weaving, or, of course, it can be bought from any basket factory.

If we make the hamper three inches high, each piece of cane must be sixteen inches long. These seven lengths of cane are for the foundation of our hamper, and we will call them the "spokes" whenever we refer to them, as they remind us of the spokes of a wheel.



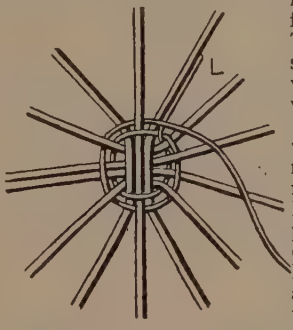
1. Position of the canes

Form a cross with four spokes across and three spokes upright, the three upright spokes being in front as in picture 1.

Hold these between the thumb and first finger of the left hand.

Our next step is to select a long piece of "No. 1" (or fine) cane, which we shall call the "weaving-cane," as it weaves in and out the spokes, just as the threads of any woven material pass over and under each other.

We must hold the weaving-cane in our right hand, a few inches from one end. Place this *end* of the weaving-cane at the dot in picture 1, and pass it under the four spokes at A, over the three spokes at B, under at C, and again over at D. We draw this as tightly as possible and pass the cane under the tiny end to form a *tie*.



2. Beginning to make the basket

In picture 2 we are able to see just how the weaving-cane travels, if we follow it up from the letter L.

From this point we weave over one spoke and under the next until we have passed eight spokes, which brings us to the left side of the picture where we see two spokes taken together. Some of us may think this a mistake, but in weaving we must have an odd number of spokes, because where the weaving-cane passes over one time, the next time it must go under.

At the place marked x in picture 2, we take two spokes together and treat them just as one spoke.

By taking the two together it fastens the odd number in quite securely. Continue the weaving over and under, taking care, when you come to the spoke with the little bit beside it, that you treat that spoke and the little bit as one. We must remember always to weave in the direction in which we began.

If we have done our weaving correctly, the weaving-cane will now pass under the spoke over which it went the last time round.

We must continue our weaving until we have covered about one inch from the centre of the basket. Then cut off one of the two spokes taken together and what is left of the tiny bit of weaving-cane where we started.

One very important thing which it will be well for us to make a note of just here is the right way to hold our work. Hold the work in the left hand perpendicularly, the weaving-cane being held in the right hand just like a skipping-rope about two inches away from the basket. We now slip the first finger out and hold the cane between the thumb and the second finger.

Don't think Mr. First Finger has nothing to do. He is a very important person, and acts as a guide to Mr. Weaving-cane, guiding and pressing him always into his proper place. We must also be very careful never to pull the weaving-cane, but to bend it round the spokes, moving the basket up and down at the same time.

Every touch of our fingers has a permanent effect on the ultimate shape of our

3. The basket without the lid

4. The lid of the basket

5. The basket complete

basket, and no subsequent pressure will alter it. We shall be able to begin a second basket much better after we have thus learned to weave properly.

Basket-weaving is most fascinating work when once we have acquired the art of weaving easily; therefore it is worth while to practise weaving, as from this small beginning it is possible to make any number of very pretty and useful articles.

How are we to turn up the cane for the sides of the hamper?

We notice the alternate spokes are on the top of the weaving-cane. These spokes we bend away from us. Weave round once again, when, of course, the other spokes are on the top. These also must be bent away from us. We must continue weaving as before, taking care to keep the spokes nearly at right angles to the bottom of the basket.

We must remember, as we weave the side of the hamper, when the weaving-cane is going behind a spoke, to draw that spoke back with the guiding finger and slip the whole hand behind it to put the weaving-cane in place. The more we press on the spokes when drawing them back, the more the sides of our basket will slant outwards.

By this time the side of our hamper measures two and a half inches from where we turned it up. Here we take a length of No. 4, or rather thick, cane to weave the other half-inch. An important point to learn just now is how to join a new piece of cane.

We must always finish off the end of the old weaving-cane, when we have come under a spoke, by pushing the loose end of the weaving-cane down the side nearest to us of the same spoke. Take a new piece of weaving-cane and pass the end down the far side of this spoke. Both the old and the new weaving-cane pass behind the same spoke, but the join does not show at all on the right side of the basket.

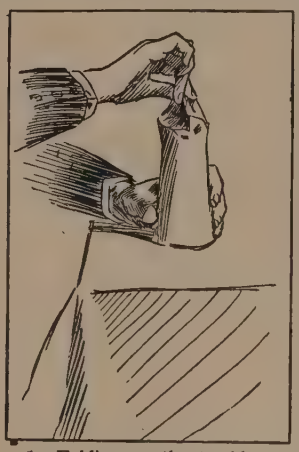
To finish our basket we cut an inch off each spoke with the exception of two, which we leave to form the handle, as seen in picture 3. Each spoke must be turned back the opposite way from which we have been weaving, and pressed down the far side of the next spoke until it lies level with the last line of weaving. To form the little handle, we cross the two spokes and push the ends down so that one end goes in where the other starts from.

Having made our hamper, we must turn our attention to the lid for it, which is made exactly as the bottom of the hamper, using seven spokes about six inches long.

When the weaving exactly fits the top of our hamper, we finish by pushing the spoke-ends down the sides of their left-door neighbours.

THE MAGIC TUMBLER

THE magic tumbler is a conjuring trick that requires little preparation and no expense, unless the conjurer is clumsy enough to break the tumbler as he tries to perform the feat. The trick consists in taking a tumbler, covering it with paper, placing it on the table, and, with one push of the hand, passing it through tablecloth and table on to the other hand, held beneath the table. At least, this is what seems to be done, and that is what counts in a trick.

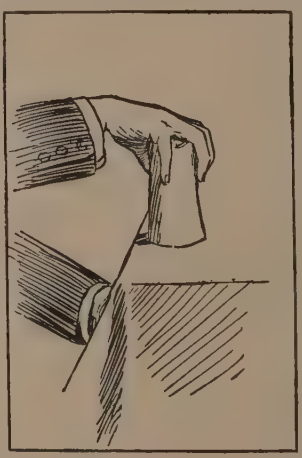


1. Folding up the tumbler

The young conjurer seats himself at a table having a tablecloth on it, with his audience on the far side of the table opposite him. He has an ordinary tumbler and a piece of paper a little larger than the page of this book. If the paper is tinted, so much the better, it will help the deception, and it should be rather stiff.

The tumbler may be passed round for inspection. "This tumbler," you say, "is made of Chinese glass, and it has the marvellous property of passing through any solid substance without breaking. I merely wrap it in this paper"—here you fold the paper round it, as seen in picture 1, taking care that it is rather loose at the mouth end of the tumbler—"then I place it upside down on the table like this"—at this point you hold the tumbler by the right hand over the paper, as seen in picture 2, but in doing so allow it to slip out into your left hand, held on your knee.

Now you put your left hand under the table with the tumbler in it, but take care not to let it knock against the wood of the under side of the table, as this would disclose the trick. You have your hand on top of the paper that is supposed to have the tumbler inside it.

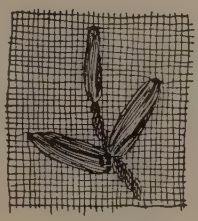


2. The tumbler about to pass

"Magic tumbler," you say, "Hong-Kong, Canton, Manchu, go!"—any other nonsensical phrase will do—and you press sharply upon the top of the paper, squeezing it right down to the table. Then you produce the tumbler from beneath the table with your left hand.

A TABLE-SQUARE IN RIBBON-WORK

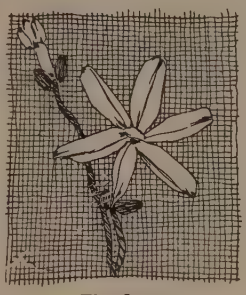
A TABLE-SQUARE is a useful Christmas present, and if embroidered with dainty ribbon-work it can be quickly and easily made. Suppose we choose to make one for a present, and have never tried to do ribbon-work before. This is the way we should set about it. We want material that is easy to work upon, and at the same time inexpensive; also a simple but pretty design. For the first, it is cheaper to buy half a yard of fine canvas, at from 9 cents to 20 cents the half yard, according to the quality and width. As the canvas is usually very wide—that used in the picture measured 44 inches—two or three articles can be made from it besides the table-square.



The leaf

We will cut our table-square 18 inches by 18 inches—that is just half a yard square. Next we draw with a lead pencil the outline of the shape shown in the picture. The middle points of the half-circles are found by folding the canvas in halves, just one way and then the other, but not so as to crease the canvas. We must be sure to get the pointed corners opposite each other. The material may, of course, be left square, but it looks better shaped.

Now for the design. If you can do it, draw your own from a real spray of flowers; failing that, get a ready-made transfer that will cost from ten to fifty cents; place it, shiny side downwards, on the canvas, and press the paper with a hot iron until the design is well impressed.



The flower

The flower chosen here is the jasmine worked in yellow, and it is repeated in each of the four corners. We choose it because of its simplicity.

Three kinds of silk ribbon are used for ribbon-work. The narrowest is the Pompadour or China ribbon (also called "baby ribbon"), about an eighth of an inch in width. A wider kind is the giant ribbon—it is gigantic only compared with the narrow kind—and a third is the rainbow ribbon, which, as its name tells, is shaded or variegated.

We will choose for our first attempt the narrow yellow Pompadour ribbon at two cents. Four yards will be ample for the four sprays of jasmine. About half a yard of green ribbon is wanted for the leaves of each jasmine spray; but the quantity will depend on the skill which we use in passing from one leaflet to another. Wasteful people put as much ribbon on the back as on the front.

The table-square ornamented by ribbon-work

We shall also want a 8 cent ball of green *lustrine* for the stems, a fairly blunt, short, large-eyed needle, and a little yellow sateen to line the square.

An ordinary darning-needle or crewel needle will serve the purpose, or a rug needle if one is at hand. We must see that the point is not very sharp, and watch that it does not pierce the ribbon anywhere.

In taking a needleful of the yellow ribbon for the blossoms, it is a mistake to cut a long piece, for the ribbon so easily twists, and tends to get stringy when passed often in and out of the holes in the canvas. So we take a rather short needleful, knot it at one end, and pass the needle from the back to the front of the canvas at the centre of one flower. We put the needle through the end of the petal, or rather, as a botanist would say, the leaf of the corolla, and while drawing the ribbon through after it, place the left thumb under or over the ribbon to make it lie untwisted. Bring the needle out again through the adjoining lower hole of the canvas, and form the other half of the petal.

Of course, the stitch might be taken from the centre of the flower again, but that would waste the ribbon on the back of the canvas. Then make the other petals and the tube of the corolla. A stitch taken sideways forms the centre of the flower, or French knots may be made here, preferably in a darker shade. Two long stitches of green ribbon form the two halves of the leaf. The edges of the two stitches suggest the midrib. To fasten off the ribbon, we draw it through several of the stitches in the back. The ribbon *must* lie untwisted and even on the front of the canvas. This is the secret of successful ribbon-work.

We shall be surprised to find how quickly a leaf can be made. The stems are stitched with *lustrine* in long and then short slanting stitches taken downward from the top to the bottom of the stem.

When all the sprays are worked, stitch the sateen lining on to the back of the canvas. If the canvas has been crumpled at all in working, it may be pressed flat with an iron. A pretty edging may be added to the table-square by making a frill of some of the variegated green ribbon at 5 cents a yard. We draw up the thread which can be found along one side of it, and sew the ribbon round the edge of the canvas.

Ribbon-work is suitable for glove and handkerchief sachets, nightdress-cases, table-centres, fancy bags, doyleys, cushion-covers, tea-cosies and dress trimmings.

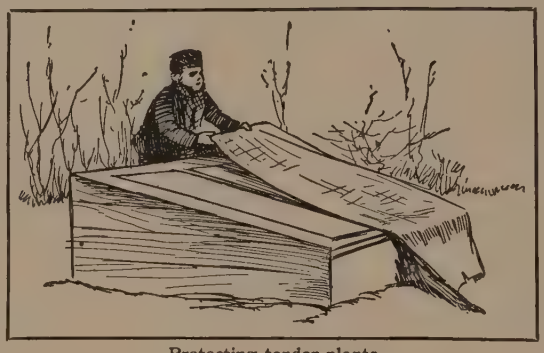
A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO IN THE MIDDLE OF DECEMBER

WHAT we do at this time of year depends entirely upon the weather. If it be fine and open, and we especially wish to make a new pathway, we may do so. There are a few things we ought to remember in making this, and one is to make it rather higher towards the centre than at the edges, as the water drains away better and gives us a much drier and pleasanter path to walk upon in wet weather.

It will be better to do no more planting in our gardens, because even if it is not actually frosty at the time of planting, probably it will be before the roots of the plants could become settled in the soil, and this might cause them to decay and die. Yet if we may not plant we must still not neglect our gardens. Suppose we have put in two or three new rose-trees, and perhaps some rose-cuttings, which are so charming to grow, as they make what is called "roses on their own roots," and there is never the fear of suckers, which are often extremely troublesome.

Now we will suppose a spell of frost comes, and after that, naturally, a thaw. The ground becomes quite soft and loose, and those newly-planted subjects — whether roses or anything else, for that matter—that are not firmly established in the soil, become loosened with the soil, and lose the little grip they had obtained of it. This is the one thing to fear, for if it happens and is not remedied, without a doubt the plants will die. But, happily, it is a state of things quite easy to remedy; it simply means treading or otherwise making the soil firm and close about the plants, as it was before the frost acted upon it.



Protecting tender plants

Though the action of the frost on the soil may be a source of danger to newly-planted trees and cuttings, we must bear in mind that, apart from this, the frost does a great deal to sweeten the soil, and makes it in excellent condition; and for this reason any bit of the ground that is not occupied by plants should be dug up so that the frost may penetrate and do the utmost good possible.

How does a gardener regard a heavy fall of snow over his many plants? As Nature's wisest and best protection from the bitter winds and frosts. No wind can hurt our plants when they are safely under their snow blanket. But often the winter winds and frosts are keen and biting when there is no snow upon the ground. This is the hardest trial our plants have to bear, and it may be necessary to afford protection to a few that are not quite hardy in our winter climate.

If we are able to gather a few armfuls of dry bracken, we may put it round such plants as the rhododendron, and even round about a rose-tree if of a more than usually tender nature, and anything else for which we have reason to fear. If some of these rather tender subjects die down completely, and are below ground for the winter, we may cover the earth above them with dry leaves or with ashes. Either of these is very helpful in keeping the frost from reaching them.

It is necessary to pay frequent attention to violets at all times if they be growing in frames, and we have undertaken the care of them.

Never coddle violets; they are hardy, brave little plants, and they strongly object to being treated as if they were tender and fragile. If they could speak, how often they would plead for air, air, air, more air! You ought to have gathered many blooms by this time even from a 6 by 4 foot frame, and have the prospect of gathering a bunch on Christmas morning, though the time the plants flower will, to a certain extent, depend upon the variety being grown. Very little water — generally none at all—is needed for weeks together at this season, but unless the thermometer shows that it is freezing, or there is a sharp wind, raise the lights during the warmest portion of the day. Even at night, unless very cold, the lights need not be quite close down, but the opening can be covered with a bit of sacking, and in this way there will be a slight amount of ventilation.

You will think, perhaps, that great importance is being laid on giving them sufficient air. But there is nothing like it to keep them healthy. Insufficient air generally means that leaves become affected with mildew, and whole plants may "damp off," as it is called. But in really severe weather we must run the risk of that for a short time, and during sharp frosts the lights go down, and mats or anything we can lay hands on may be covered over them, so that Jack Frost shall not touch the pale, sweet flowers. If he does he will leave the mark of his breath upon them, and they will become discoloured.

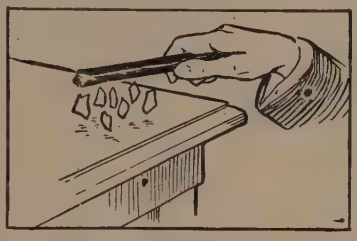
Our pot plants that we are sheltering in the house or in a greenhouse will now need less water than at other seasons when they are growing freely. In the winter a great many of them go almost to rest, at any rate they are not pushing out new growths unless kept at a high temperature. Never let pot plants stand in a saucer of water.

ELECTRICITY MADE AT HOME

ELECTRICITY is perhaps the most powerful and yet the most mysterious force in the world. Yet the knowledge of it is almost new. It is easy nowadays to push a button or press a knob up or down and so light up a room with electric light. Yet this has been possible only during the last twenty or thirty years. When our grandfathers were boys, electric lighting, even in a palace, was quite unknown.

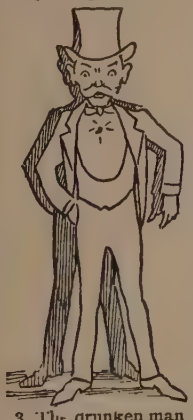
The experiments which made the powers of electricity known go back much further, and it is about 150 years since Benjamin Franklin began to find out something about this mysterious power. Some of the methods he used were very simple, and any boy can try them for himself.

Take a piece of ordinary brown paper, and warm it before the fire. When it is hot, lay it on the table and brush it briskly with a warm and dry clothes brush. You then pick it up quickly and hold it to the wall. You will find that the paper has become electrified, and that it will cling to the wall. It clings because it is *electrified* and is attracting the wall to it. If you warm the paper and brush it as before, and then hold it over some little bits of lighter paper, the small pieces will fly up and cling to the electrified brown paper.



1. The exciter picking up paper

It is even possible to get sparks from electrified paper. Take a large sheet of stout drawing-paper, warm it till it is thoroughly dry, lay it on a dry wooden table, and rub it very briskly with a piece of flannel or woollen material to electrify it. Then put a piece of metal—a watch-chain or a bunch of keys—in the middle and lift the paper off the table by two corners. Then, if someone else puts his knuckle or finger to the metal, a bright spark will pass between his finger and the metal, which, however, he won't feel. If the weather and the paper are thoroughly dry, you may get a spark an inch long.



3. The drunken man Cut Out

But paper is not the best thing to try these experiments with. For one reason, it will not retain electricity very long, and for another it is not the most easy substance to electrify.

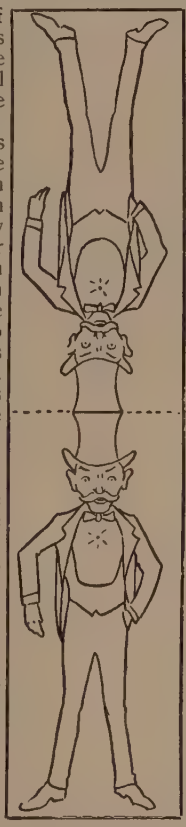
A piece of glass rod or tube is a better *exciter*, as we call anything electrified by rubbing. A solid rod is the better, and a chemist can sell us a piece for a penny. To excite, or electrify, this, we must rub it briskly with a piece of dry silk. Or we can take a stick of ordinary sealing-wax, which must be rubbed with flannel. A third kind of exciter, and a very good one too, is a piece of vulcanite, rubbed with flannel.

Vulcanite is hard rubber, and fountain-pens are generally made of it. So if we can get an old fountain-pen it will do first rate.

We take our glass rod, sealing-wax, or fountain-pen, and excite it by rubbing with the silk or flannel. Then we hold it near some tiny scraps of paper or bits of bran, and it will pick them up as seen in picture 1.

We must be careful that everything is quite dry, and the articles must be warmed before the fire to make sure they are dry. All experiments with this kind of electricity will fail most disappointingly unless everything is warm and dry, including the weather. We shall find sometimes that the rod will pick up the paper, and afterwards will not attract the same piece. This is because the little bit of paper has received a charge of electricity from the rod, and when two electrified bodies come together they repel one another, if both are electrified with the same sort of electricity.

If the bodies are charged with opposite kinds of electricity they will attract one another. These two sorts of electricity are called *positive* and *negative* electricity. Glass rubbed with silk gives positive electricity, and sealing-wax or vulcanite rubbed with flannel gives negative electricity.



2. The drunken man

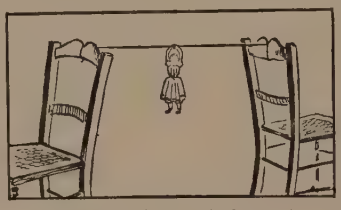
Take a piece of thin paper—the white edge off a newspaper will do — and cut a strip, say, about four inches long and about an inch wide. Double it over and bring the two ends together. Now draw a man as shown in picture 2, and cut it out to shape. Do not cut the top, but leave it so that the figure will stand up as seen in

4. An easily-made stand

picture 3. If you excite the glass rod, and hold it near one side, the figure will roll over towards it, and if you then hold the excited vulcanite or sealing-wax at the other side he will roll back that way, and so you can attract him all round the table.

Another experiment is to make a tiny ball of pith out of the centre of an elderberry stick. This pith is very light when it is dry, and can easily be made into a small ball about as big as a pea. Fix the ball to a thread of silk, and the silk to the gas-bracket or something where it can hang down. Now excite the rod by rubbing and hold it near. The pith-ball will fly toward the rod, but after touching it it flies away again, and will keep off as long as the electricity remains in the rod. But if you have used the glass rod and then bring the vulcanite or sealing-wax near, the ball will fly to it. This shows the difference between the two kinds of electricity. Instead of the pith-ball we can use a little piece of feather if we cannot get the pith, but pith is the better. Instead of hanging the pith-ball from a gas-bracket, we can easily make a stand as shown in picture 4. This is made of a bottle with a piece of copper wire stuck through the cork. We bend the wire over as shown, and make a loop or a hook in it to tie the silk thread to. With the pith-ball we can prove that when we rub the glass with silk, or the vulcanite or the sealing-wax with flannel, the silk or the flannel also become electrified. If we roll the silk or flannel into a ball, and after rubbing the rod with it hold it near the pith-ball, the effect will be the same as if we held the rod near the ball.

5. The doll acrobat

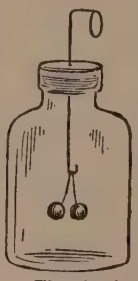


6. The acrobat ready for work

Take a piece of the white margin of a newspaper and draw a picture on it like picture 5, about two inches in height. Then cut it out to shape. Cut a small hole at the hands, but be careful to cut it round and clean. Make it big enough for the head of a pin to go through. Now we take a piece of cotton thread and run one end through the hole in the paper acrobat. We now tie the ends of the cotton to two chairs or other objects, but we must see that the thread is drawn quite tight, as seen in picture 6. Now, if we excite the rod we can make the paper acrobat swing round and round after the rod.

7. Cork and bent wire

The pith-ball electroscope is a contrivance which will be very useful in many electrical experiments, and it is easily made. With the electroscope we can always test the presence of electricity, and make a good estimate of its strength. We take a glass pickle bottle with a big mouth, and clean and dry it thoroughly. Then we put a piece of copper wire through the cork. We can do this if we make a hole in the cork with a skewer or a nail. The wire should be a little thicker than ordinary electric-bell wire. If we have to buy it we ask for No. 14, but any piece of fairly stiff copper wire will do. When we have put it through the cork, we bend one end—the one to go *inside* the bottle—into a small hook-shape. The other end is to be first bent round like a ring, and then the ring is to be bent down at a right angle. Then we shall have a piece like picture 7.



8. The simple electroscope

Now make two small pith-balls and hang them each on a piece of cotton, both the same length. Tie the two ends on to the hook in the wire and put them into the bottle and fix the cork in. The pith-balls should then be about two inches or three inches from the bottom of the bottle, as shown in picture 8. Of course, we must not forget to see that the bottle and everything else is quite dry. Now, if we excite the rod and touch the top of the wire with it, the two pith-balls will become excited, and, as both will be charged with the same sort of electricity, they will stand out apart from each other, and if we bring anything which is electrified against the copper wire we shall see the pith-balls move.

We can make electricity on a larger scale than this. Borrow a wooden lacquered tray and cut out a piece of thick brown paper (the sort of paper that large and heavy parcels from the stores are wrapped in) the same size as the inside of the tray, so that it lies flat on the bottom of the tray. Gum two slips of paper at each end of the sheet to serve as handles. Have the tray supported on two dry glass tumblers (to prevent the electricity leaking away), and warm the sheet of paper at the fire until it is thoroughly dry and hot. Rubbing will help to dry it. Then put it quickly on the table and brush it hard with a warm and dry hard clothes brush. Put it on your tea-tray which is resting on the tumblers, touch the tray with your finger, and lift away the sheet of paper by the handles you have fixed to it. Then put your knuckle close to the tray and you will get a spark, which you can get half a dozen times if you repeat the process of touching the tray, lifting away the brown paper, and putting your knuckle to the tray.

These experiments are the simplest that we can undertake, and it was by simple experiments such as these that great inventors came to understand the mysterious powers of the force that makes possible the telephone and the telegraph, and the motors and dynamos that drive railway trains and tram-cars.

MORE GAMES TO PLAY BY THE FIRE

ON page 237 of our book are some good games that can be played while sitting by the fire. Here are more games which we can play indoors.

WORD-MAKING

NEAR the top of a slip of paper each player writes down a word given out by the leader of the company. Then all start to make a list below it of other words, spelt from the letters it contains—and these letters only. When the leader says that time is up (about ten minutes should be allowed), the lists are added up, and the player who has made the largest number of words is the winner. It is not necessary to choose a very long word, for it is surprising how many words may be made from the letters contained in any word of ordinary length. For example, from the word "animal" we can get: am, nail, main, lain, and so on.

CONSEQUENCES

EACH player is provided with half a sheet of notepaper and a pencil. The game begins by writing at the head of the paper the name of some friend, a man, and a verb to show what he did. Thus: "Mr. Smith met." The written words are then folded over out of sight, and the slip of paper is passed on to the next neighbour, no player, of course, knowing what another has written. Everyone now writes the name of a lady, folds the paper and passes it on again.

This time each writes down what they think was said or done by the people whose names are hidden, and, having folded the slip, pass it on, when everyone adds the words, "and the consequences were"—whatever they like to write down. This being done, the papers are collected and someone reads out the slips. The consequences of these mixed-up tales are generally very funny.

MAGIC ANSWERS

THIS is a game in which two of the players form a plan between themselves to puzzle the rest. One of these two leaves the room, while his partner remains behind to choose with the rest of the company some object to be guessed. The one outside is then recalled and questioned by his accomplice as to what this object is. Several things are touched. "Is it this?" "Is it this?" he is asked. To every inquiry he answers "No," until something is mentioned that has four legs, and as he and his friend have previously arranged that such an article shall not be referred to till just before the real object is named, he knows that the *next* question may be answered with a "Yes."

The secret can be made more difficult for other players to find out by altering the plan, and agreeing that a certain number of questions, let us say six, shall be asked after mentioning the four-legged article before the chosen object is referred to. But several little variations of this secret game will, no doubt, suggest themselves to our readers.

CLUMPS

THE players divide into two parties. One player from each party leaves the room, and between them they think of some article or thing, let us say, "The smallest window in St. Paul's Cathedral." While they are outside, the rest form themselves into two circles, one at each end of the room. On returning, one of the "thinkers" goes into each of these circles, where he is plied rapidly with questions, the answers to which must only be "Yes" or "No."

Each player takes it in turn to ask a question—"Is it animal?" then "Is it mineral?" "Is it vegetable?" "Is it in England?" "Is it in this room?" and so on, and the side that guesses the object first claims both "thinkers," and so adds to its numbers, and the game begins again. When the players are tired, the biggest side has won.

SIMON SAYS

SIMON stands up in front of the row and, with a finger or thumb held up, cries: "Simon says, turn up!" All the rest must immediately do as he does. Then he gives the order: "Simon says, turn down!" And each must point downward. He watches carefully the while to see that no one disobeys him. If presently he gives an order, omitting the words "Simon says," anyone who obeys it must at once pay a forfeit. It is a trap that a player easily falls into, and great care must be taken not to do as Simon does unless the command begins "Simon says."

PROVERBS

WHILE one of the players is out of the room, the rest think of a proverb. It should contain at least as many words as there are players.

The boy or girl who has been sent out is now called back, and begins the game by asking the first in the row a question. This question may be of any kind, but the answer to it must contain the first word of the proverb. The next is then questioned, and replies with the second word, wrapped up, as it were, in the answer. The longer the answer the more difficult it will be for the questioner to pick out the word that helps to make the proverb. But no answer should contain more than a single sentence.

Supposing the proverb to be, "It is never too late to mend," and the first question is, "How many apples do you eat in a day?" the answer might be, "As it is not wise to eat too much of anything, there are some days when I don't eat apples at all." The word "it" is not easy to notice in this sentence. But it would be more difficult to hide the last word in the proverb.

Let us take as a question, for example, "Are you fond of reading?" The answer might be, "Yes; but I tore the pages of my favourite book, and must mend them before I can go on with the story." If you wish to puzzle the questioner you should not let your word begin or end the sentence.

THE GAME OF ZOO-GUESS

EVERYONE at a party was trying to think what a "Zoo-guess" could be, when the door opened and a maid brought in a big board with two sheets of white paper pinned to it. She placed the board on two chairs at one end of the room. At the other end Etta's mother sat at a table, and in front of her the children saw a bundle of little pink envelopes.

"First," the mother explained, "every boy must choose a partner.

"Now," she said, "I want two couples to come first. The boys will take these two black chalks, and they will stand by the board. The girls will stand by me at the table. I shall give them each an envelope, and when I say 'Go' they must run to their partners and give them the envelopes. The boys will open the envelopes, and they will find pieces of paper inside with the names of animals written on them. Then, as quickly as possible, they must try to draw the animals on paper, while their partners watch. The moment the girls can tell what the boys are trying to draw, they must run to me and tell me what the animals are meant for, and the girl who gets to me first will win a prize."

Then the fun began.

Two boys, with the black chalks ready, stood by the board, and their two girl partners stood at the table.

Etta's mother gave each girl an envelope, and said: "Now run as quickly as you can, and remember that the girl who gets back to me first wins." Then she called out: "One, two, three—go!"

Both girls ran as hard as they could down the room till they reached the boys. Then they gave up the envelopes, which the boys tore open as fast as they could.

All the other children were excited now, and leant forward to watch.

The boys read the names of the animals on the pieces of paper they found in the envelopes, and then tried to draw them.

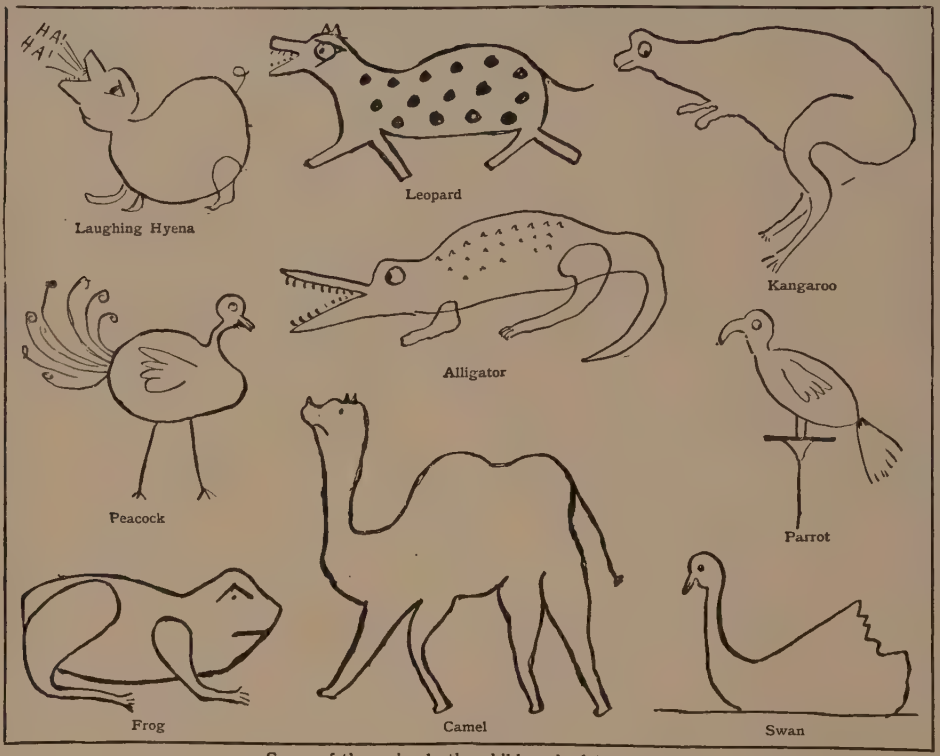
At first they only made marks that did not seem to mean anything.

Then one of the girls saw a curly line that looked something like an elephant's trunk, and, without waiting for anything more, she rushed back to Etta's mother at the table and said: "It's an elephant."

"Wrong! Go and look again."

The girl ran back and looked again at the queer thing her partner was trying to draw. She saw now that the curly line she had mistaken for a trunk was meant for a swan's neck, but before she could run back the other girl had managed to guess what her partner was drawing, and so won.

Of course they made mistakes, because they were so anxious to tell Etta's mother what the animals were, and so win a prize, that they never waited for the drawing to be finished, but began to guess the moment



Some of the animals the children had to guess

they saw a beak, or a tail, or a neck that they thought they knew.

Sometimes the two girls would guess what their partners were trying to draw at the same moment, and then there would be a tremendous race down the room to see which could tell Etta's mother first. These races were really the best part of the fun, because sometimes the girls got so excited that when they got to the table they could not say the animals' names properly.

When the game was over, Etta's mother gave prizes of chocolate animals to those who had guessed quickest, and all the children said they had never been to a party they had enjoyed so much.

THE PUZZLE OF THE MILLER'S SACKS

A MILLER had some sacks of flour, each sack bearing a number. He arranged them as shown in the picture, which, as will be observed, shows a set of three sacks in the middle. Next these on each side is a pair of sacks, and on the far side of each pair is a single sack. Now, something curious may be observed about the figures. If we multiply the number on the left-hand pair, 28, by the number on the single sack next it, 7, we get 196, which is the number on the three sacks in the middle. But if we multiply the number on the remaining pair, 34, by the number on the other single sack, 5, we do not get 196.

The problem set by the miller to his friends, as explained by Mr. Henry E. Dudeney in his "Canterbury Puzzles," is to place the nine sacks, with as little trouble as possible, so that each pair, when multiplied by its single neighbour, will make the number in the middle.

HOW TO MAKE YOUR OWN TOFFEE

THE great thing in making sweets, and quite as much with toffee as any other, is to secure a good reliable recipe, and to follow it exactly. It is never worth while to guess at quantities ; weigh everything carefully and correctly, and if possible include all the ingredients mentioned in the recipe. Another little hint worth heeding has to do with the quality of the materials used—let them be of the best quality you can obtain.

Toffee may quite well be made over a gas-ring, or on a cooking-range, but if it has to be made over an ordinary open fire it certainly must not be a dull or smoky one, but one with clear red embers. The saucepan is the next consideration, and it is an important point to see that it is scrupulously clean ; besides this, it should be a large one in proportion to the ingredients that are to be put into it, because, when boiling, the liquid sweet-stuff sometimes rises very quickly in the saucepan, and it must not be allowed to boil over.

We have our scales and various weights, and to make the toffee we must proceed to weigh these ingredients :

Four ounces of butter. One pound of brown sugar. Mix these well with a tablespoonful of water. Add four ounces of molasses and the strained juice of half a lemon.

It is well to put the butter into the saucepan first, and let all the ingredients melt slowly.

Great care must be taken to prevent burning, and the toffee must not be left unattended at this stage for a moment. Nothing is better to stir with than a wooden spoon. It is almost impossible to tell exactly how long to boil the toffee—about seven minutes—but a reliable test to show that it is well cooked is to drop a small quantity of the liquid into cold water ; if it be cooked sufficiently, as it becomes cold in the water it will appear crisp and hard. It may then be taken from the fire.

A large, well-greased dish should be in readiness, into which the toffee is poured. It must be left for a short while, but before it is cold it must be cut with a knife in small squares, but should not be removed from the dish until considerably harder than it is when this marking with a knife may easily be done.

When quite cold it should be stored in a tin to keep it crisp and dry. If we wish our toffee in its daintiest form, we may wrap each square in a tiny piece of oiled paper. It is very neccessary to add the caution that great care should be exercised in pouring the hot liquid from the saucepan to the dish, as a burn from this sticky, sugary liquid is terrible.

WHAT THE JESTER DID WITH THE ROPE

THE jester in his prison, as described in the problem on page 2034, looked at his precious piece of rope, and wished it were elastic, so that he could stretch it and make it long enough for him to reach the ground with it. Fortunately the rope was stoutly made, though it was too short.

While fingering it the jester saw how thick and strong the strands of the rope were, so he began unwinding them. Then he thought, "I will untwist the rope and see if it is possible to join the separate strands in such a way as to make a long rope." This he set about doing, and when the untwisted strands lay on the prison floor, he took up the ends and intertwined them as he had seen a sailor do when splicing a rope. Then he tugged at the ends with all his might, and, finding the join was firmly made and the rope quite strong, though much thinner, he waited till night-time. He had previously loosened one of the bars in his window, and, tying one end of the rope to the upper bar, he wriggled his body through the window and let himself down by the rope into the moat.

He had judged the length of rope very truly, and soon found himself in the water. In a minute or two he had scrambled out of the moat and got safely away.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 2249

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THE STORY OF LITTLE RED RIDING HOOD

A LITTLE girl once lived in a cottage at the edge of a great wood. Her mother had made her a pretty little red cloak with a hood to fit over her fair curls, and she was so fond of it that she hardly ever wore anything else. And so everybody called her Little Red Riding Hood.

At the other side of the wood was a tiny house among the trees, where Little Red Riding Hood's grandmother lived all alone. One fine afternoon Little Red Riding Hood's mother said:

"Your grandmother is not very well. In this basket I have put some eggs, a jar of honey, and some butter. Put on your cloak, and take them to her, with my love. But be sure that you do not stay long on the way, because it will soon be dark, and then, you know, the wolves come out."

So Little Red Riding Hood put on her cloak, and away she went.

But the wild flowers were very beautiful in the wood, and she put down her basket on the trunk of a tree and began picking them.

Little Red Riding Hood was very fond of flowers. She knew all their names, and when she spoke to them she loved them so that she thought they understood all that she was saying.

The little grey squirrels, with their funny long tails, darted out from the bushes and ran up the trees, where the birds were singing among the leaves. And Little Red Riding Hood forgot all about the wolves.

Soon it began to grow dark, and, remembering what her mother had said, she jumped up, and was picking up her basket, when there bounded up to her a great wolf!

"Where are you going?" asked the wolf. He spoke so kindly in his big, gruff voice that Little Red Riding Hood thought he could not possibly hurt her. So she told him she was carrying some eggs and honey and butter to her grandmother, who lived in the little house at the edge of the forest.

"Oh," said the wolf, "I know where that is!" And he ran on and was soon out of sight.

The wolf ran very fast, and did not stop until he came to the little house. He knocked at the door, and the grandmother's voice called out:

"Pull the bobbin and the latch will go up."

He pushed open the door, and, going straight up to where the old lady lay in bed, opened his mouth and devoured her! Then he put on her nightdress and cap, jumped into the bed, and cuddled down among the clothes. Presently came a tap at the door.

"Pull up the bobbin and the latch will go up!" called out the wolf in a voice like the grandmother's.

Little Red Riding Hood walked in.

"Draw up a chair," said the wolf, "and tell me what you have in your basket."

Little Red Riding Hood got a chair and sat down by the side of the bed.

"I have brought you something nice to eat, granny," she said, as she bent over the bed. "But what great ears you have, grandmamma!"

"All the better to hear you with," said the wolf.

"What great eyes you have, grandmamma!"

"All the better to see you with."

"And, oh, what great teeth you have, grandmamma!"

"All the better to eat you with!" cried the wolf, jumping out of bed.

Little Red Riding Hood ran screaming to the door. The wolf ran after her, and had almost caught her, when a shot from a gun was heard, and the wicked wolf dropped down dead.

A woodcutter who was passing had heard the cries of Little Red Riding Hood, and popped his gun through the window in time to save her.

Little Red Riding Hood was very grateful to the woodcutter, but she had been so frightened that she ran all the way home. When she came to the cottage she found her mother waiting for her at the door.

The mother drew Little Red Riding Hood in, and listened to her story of all that had happened. She was delighted to have her little girl home again, and Red Riding Hood was so happy to be out of danger that she promised her mother never to be disobedient any more.

LITTLE RED RIDING HOOD IN THE WOOD

THE WOLF BOUNDED UP TO RED RIDING HOOD AS SHE GATHERED THE DAISIES IN THE WOOD
Little Red Riding Hood found the flowers so beautiful that she stopped on her way through the wood to pick them. Soon it began to grow dark, and as she picked up her basket to go there bounded up to her a great wolf.

THE FABLES OF ÆSOP THE SLAVE

THE ANT AND THE GRASSHOPPER

A NEST of ants had been busily occupied all through the summer and autumn in collecting food for the winter, and they had carefully stored it in the

wonderful underground chambers of their home. Thus, when the winter came, they had plenty of food to eat.

One cold day a grasshopper, who was almost starved with cold and hunger, came to the ant-hill and begged that the ants would give him a little food to save his life.

One of them asked him how he had spent his time during the summer, and whether he had not saved up anything for the winter. He replied: "Alas! gentlemen, I spent all my time in singing, playing, and dancing, and never once thought about the winter."

The ant answered: "Then we have nothing to give you; for people who play all the summer must expect that they will have to starve in the winter."

Lay by for a rainy day.

THE WOLF AND THE KID

A WOLF one day saw a kid that had strolled into a distant field, and pursued it. The kid ran away as fast as it could, but finding that the wolf was

overtaking it, and that it had no chance to escape, it turned round and said:

"I see that it is of no use to run away, and that I am going to be eaten. But I would like to die as pleasantly as possible, so please play me a tune, and let me have a dance before you kill me."

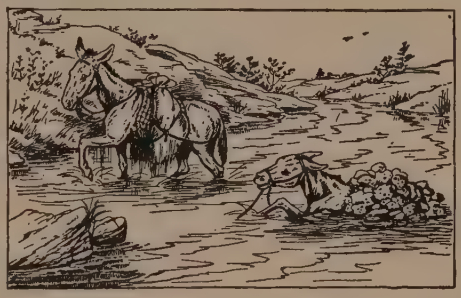
The wolf played a tune on the pipes, and the kid danced merrily up and down the field. The result was that the noise of the pipes attracted the dogs from the farm, who rushed up and drove the wolf away.

As he escaped into the forest he said: "This is the consequence of meddling with things that do not concern one. My business was to play the butcher, and not the piper!'

Never meddle with things that do not concern you.

THE TWO LOADED ASSES

ONE day two asses were travelling along the road. The one was loaded with salt, and the other with sponges. Presently they came to a river, and as there was no bridge they had to wade through the water.



The ass with a load of salt went first, and happened to stumble over a stone, so that he fell down in the water. He was soon on his feet again, but the water dissolved a great part of the salt and washed it away from the baskets on his back, so that the donkey found himself relieved of a great part of the load which he carried.

The ass with the load of sponges noticed this, and at once thought that he would do the same. So he lay down for a minute in the stream; but, to his astonishment, he found that, instead of the sponges being dissolved away, they soaked up a quantity of water, and his load was many times heavier than it was before. The result was that he could not get up, and the stream, which had relieved the one of his burden, drowned the other.

One man's meat is another's poison.

A TALE OF CHRISTMAS EVE

Told by a Christmas Stocking

It was long past midnight, and the Stocking began to be angry.

"To be taken out of a nice comfortable drawer on a winter night," it said querulously, "and, without being hung on a nice horse in front of the kitchen fire, to be strung up to a bedpost like a common thing. Upon my word, it is too bad!"

A little girl lay fast asleep in the bed. The curtains were drawn across the window. In a saucer on the chest of drawers burned a night-light. The clothes of the sleeper lay neatly folded on a chair beside the wall; the stockings which she had worn during the day hung dreaming over the back of this chair, and underneath were her little buckled shoes, both of them snoring.

"I miss my mate," said the Stocking, glancing at the folded pair of sleeping stockings over the back of the chair. "It's downright monstrous to take one stocking from a drawer and leave its mate behind! If I worked for a one-legged child or a mermaid it would be a different matter. Oh, my poor heel and toe, how cold it is!"

Just as it finished speaking there was a noise in the chimney, and, looking in the direction of the fireplace, the Stocking was amazed to see a very old, white-bearded gentleman in a red cloak, with a hood on his head descending to the hearth. The night-light burned suddenly brighter; the room became warm and cheerful. The Stocking, which was too wonder-struck to speak, thought that it had never seen such a quaint old man in all its life.

"If this is a burglar," it thought, "may I have a potato in my heel for the rest of my life!"

The old gentleman, who was no other person than Father Christmas, advanced to the bed and let a big bag which he carried on his shoulder slide to the ground.

"Ha," he said, in a very cheerful voice, "how she has grown, to be sure! Why, when I was here twelve months ago I could have put her into one of my waistcoat pockets." He looked about the room. "Nice and tidy," he said approvingly. "Clothes neatly folded; sponge squeezed out; flannel hung to dry; no broken toys about; the doll I gave her last year safely tucked up in its cradle, and the Teddy Bear hasn't lost an eye, and grey rabbit is still full of sawdust. Come, Marsie, you're growing quite a good little girl." He walked to the foot of the bed. "Ha," he said, laughing, "this is the only night in the year when the foot of the bed has a stocking!" He put his hand

on the Stocking, and said: "Well, Master Woolly-Ribs, how do you find yourself to-night?"

"Rather lonely," answered the Stocking. "I miss my mate terribly; and it's cold. I haven't been aired. They took me straight from the drawer and hung me up here without a glimpse of the fire."

"Oh, I'll warm you quick enough!" said Father Christmas, and, diving into his sack and pulling out all manner of toys and boxes of sweets, he began to cram the Stocking with Christmas presents.

"Hold hard!" cried the Stocking. "You'll split me if you aren't careful! What next, I wonder! I'm a stocking. What do you take me for—a Danish bazaar, the toy department of a big store, or what?"

Father Christmas laughed.

"You're new to this game, then?" he asked.

"I was only born this winter," said the Stocking. "I grew on a very nice sheep in Russia until the beginning of the spring. Then I was cut off, sent to a mill, and woven into the handsome stocking that you see I am now. I've only been worn four times, and I've scarcely shrunk the eighth of an inch in the wash. I thought I was in for a very easy life. My young lady doesn't wear me hard, and Neto, her auntie, is a good darner. I go for walks in the garden, rides with the pony, and drives in the motor-car. If it's very cold they wrap me in leggings, and put a nice fur rug over them. Hi! What are you up to now? I can't bear any more! You're stretching me out of shape! You'll burst me!"

In the morning, very early, Marsie woke up and emptied the Stocking of all its toys and sweets, and let it fall on the floor. Aunt Neto came later, kissed the little maid, and picked up the Stocking.

"Your work is done," said she, and placed the Stocking back in the drawer.

"Well," said its mate, "and where have you been all the night? Staying out by yourself till the morning like this! You ought to be ashamed of yourself, that you ought!"

"My dear," said the Stocking, "I've never worked so hard before in all my life. But permit me to wish you a merry Christmas and a happy New Year."

"What nonsense is this?" demanded his mate, and dropped off to sleep again.

CATCHING A THIEF

The Adventure of Screwworm, Scramblepipe, & Burrowjack

"We must put a stop to this thieving," said Scramblepipe. Another gnome named Burrowjack nodded his head and thoughtfully combed his beard with his finger-nails.

"It's my belief," he said slowly, "that the villain lives above ground."

"Ah," cried Screwworm, "I'm positive certain of that!"

Scramblepipe and Burrowjack looked at Screwworm.

"Yes," said Screwworm, who was a particularly small and a particularly venerable gnome, "I'm as certain of that as I am of fireworks, ironmongery, boiled potatoes, tableaux vivants, and apple-blossom. And I'll tell you for why. *Three nights in succession I've dreamed of white coal.*"

"You don't say so!" exclaimed the other two.

"Three nights running," said Screwworm emphatically.

"What, running fast?" demanded Burrowjack with much concern.

"Those nights travelled at sixty minutes the hour," replied Screwworm solemnly.

The other two gnomes whistled with amazement.

For some weeks past the wife of Scramblepipe had missed several magnificent diamonds. Although a watch had been set, the diamonds still went. The entire underworld of gnomes had been alarmed by these robberies. It was agreed that if the thief was not very soon laid by the heels every gnome would have to turn out his pockets. This was a dreadful fear; for, as everybody knows, the pockets of a gnome contain enough red pepper to sneeze the crust off the earth.

"We'll keep a watch above ground," said Scramblepipe.

"A stop watch," said Burrowjack, with great resolution.

That night they stole noiselessly out of their black underworld. They crept on all fours, holding their breath. They

were as careful as mice, as silent as cats. Scramblepipe went first, then Burrowjack, and then Screwworm. They crept from the blackness of the earth into the white moonlight of the forest. Not a leaf was stirring; not a sound rustled the stillness.

Suddenly old Screwworm screeched in a loud voice:

"There he is! That's the villain! See how guilty he looks! Throttle him, stab him, cut him into mincemeat, tickle his ribs and fry his toes!"

The other two looked where he pointed, and saw Tom Squirrel burying something in the ground.

"Thief! Thief!" they cried in loud voices. They began to dance with fury.

Tom Squirrel looked up, brushed his whiskers with his paws, and then nipped up a tree.

"Fetch a ladder!" cried Screwworm.

"And a policeman's whistle!" shouted Burrowjack.

"And a club for to knock his head off!" yelled Scramblepipe.

The three little gnomes ran frantically about in every direction, screaming all the time:

"Now we've got him! Now we'll catch him! Oh my, isn't it Turkish delight to catch a thief?"

They got a ladder and sticks and a policeman's whistle, and ran to the tree. Tom Squirrel sprang lightly on a branch and sat down. Burrowjack put the ladder to the tree. Scramblepipe jumped about, waving his stick. Old Screwworm blew the policeman's whistle till he was red in the face. Tom Squirrel blinked his eyes and hummed softly: "Gnome, Sweet Gnome."

Scramblepipe went up the ladder. Tom Squirrel cocked his tail and hopped to another tree. Down came Scramblepipe, chuckling with delight, and the ladder was put to the other tree.

"Your turn now," said Scramblepipe to Burrowjack.

"Right you are, old gingerbread!" said Burrowjack, and nipped up the ladder with his stick held tightly between his teeth.

Tom Squirrel hopped to another tree, and down came Burrowjack, screaming with laughter.

"Your turn now, Screwworm," said Burrowjack. And old Screwworm, putting his policeman's whistle behind his ear, mounted the ladder one step at a time.

"Steady does it," said the old fellow.

"Mind your feet don't get cold," said Scramblepipe.

"Hullo! Hullo! Hullo!" cried Screwworm suddenly. "What have we here? Blushing birds! Birds a-blushing, and under their own noses, too? They're the thieves! They're the thieves! Now we've got them!"

He had seen a nest of red-breasted birds on the next tree. The other two swarmed up to this nest and pulled it down. They tore it to pieces, and searched among the twigs and moss and horsehair, but could find no diamonds.

"It's a mare's nest!" cried Burrowjack angrily, looking at Screwworm with a threatening eye.

"Don't hit me," pleaded Screwworm. "I can't bear being hit in the moonlight, not even on the top of the head, I can't."

One of the little birds moved at Scramblepipe's feet. He stooped down to pick it up, and saw in a hollow of the old tree an immense toad.

"Hist!" he said. "Let's have a joke. Here's old Tom Tiddler, fast asleep!"

They got sticks and pieces of wood, and, laughing fit to crack their sides, boarded up the old toad in his hole.

"He'll never get out," they chuckled. "What a lark! He's there till the crack of doom! Oh, isn't that beatific?"

"And now for Tom Squirrel," said Burrowjack, growing serious.

But when they looked up, Tom Squirrel was nowhere to be seen. Scramblepipe stroked his chin; Burrowjack bit his nails.

"Never mind," said Screwworm cheerfully, "we've had a jolly night, haven't we?"

They were just about to start off, when a faint sound of laughing checked them.

"What's that?" they cried. They listened, with fingers to their lips.

"It must be Tom Squirrel," whispered Burrowjack.

"He's hiding and laughing at us," said Scramblepipe.

"Oh, he's the thief right enough!" said old Screwworm.

"Wait till we catch him!" said Burrowjack in a threatening tone.

TOM SQUIRREL LOOKED UP, BRUSHED HIS WHISKERS WITH HIS PAWS, AND NIPPED UP A TREE

"Ah, he won't laugh then!" said Scramblepipe. They went off together, saying, in loud voices:

"You'll laugh on the other side of your face when we catch you, Tom Squirrel."

. . . . . .

The world went well with Tom Squirrel for many a day, and the three gnomes were all forgotten when, a hundred years afterwards, the old tree was cut down, and the woodman was surprised to see a very ancient toad hop out of a hole, laughing so uproariously that his skin kept cracking in all directions.

"What are you laughing at?" asked the woodman.

"I've been laughing for a hundred years," said the toad, as he hopped off to the pool for a drink of water, still laughing furiously.

Looking into the hole, the woodman was amazed to see—what do you think? A heap of magnificent diamonds in the place where the toad had been squatting!

SANTA CLAUS

THE TRUE STORY OF FATHER CHRISTMAS

CHRISTMAS EVE is the greatest night in the year. It is a night of mystery. When everybody is in bed, except the policeman, down the chimney comes an old gentleman in a red cloak, bordered with white wool, carrying over his back an immense sack stuffed with toys and bonbons, which he empties into the stockings of good little boys and girls asleep in their cots.

The policeman does not see the old housebreaker: the black soots do not smirch his beautiful red-and-white cloak; more wonderful still, the smallest chimney on the humblest roof in all the world is wide enough for his descent, sack and all. The fact is, Santa Claus, Saint Nicholas, Father Christmas, Bonhomme Noël, Knecht Clobes, or whatever else children may call the old gentleman with the sack—the fact is, *he is a ghost.*

He is the ghost of that good St. Nicholas who went about doing generous acts in secret; who slipped money, silver and gold, through the keyholes or under the doors of poor people, and made homes happy without letting anyone know how it happened. Nicholas was a kind man, and now he is a kind ghost. All over the world—in Europe, America, Asia, Africa, and Australasia, the ghost of this good old man on Christmas Eve passes down millions of chimneys, and fills billions of stockings with trillions of toys and quadrillions of sweets. Yes, really and truly, it is the spirit of St. Nicholas who comes across the snow on Christmas Eve.

In France, Bonhomme Noël, as they call Santa Claus, is accompanied by another ghost—a thin, weasel-faced old gentleman, with long, grey beard, threatening dark eyes, and a frowning forehead. This is Le Père Fouettard. In French our word *whip* is *fouet;* so you see that Le Père Fouettard means, in English, "Father Whipper." This Father Whipper who accompanies Father Christmas in France carries on his shoulder a wickerwork basket filled with tiny birch rods, and he leaves one of these whips for every child who has been naughty, or cross, or greedy during the year. Father Christmas, of course, only comes to children who are trying to be good.

There is another difference in France. Children do not hang up their stockings on Christmas Eve; instead, they put their little sabots, which are wooden shoes, in front of the hearth, close to the chimney, by which Father Christmas descends. If you have read Victor Hugo's wonderful book "Les Miserables," you will

remember the story of the poor little ill-treated girl who put her shoes on the hearth year after year, and never received anything till Saint Nicholas, in the shape of a poor but good man who had been in prison, visited the scene of her misery and gave her happiness.

And this is the real mystery.

Santa Claus very often takes a human form. There are so many chimneys in the world, and children will wake up so dreadfully early on Christmas morning, that nowadays even a ghost has not time to go all round the world in a single night. So the ghost of St. Nicholas splits itself up into little atoms of kindness, and these atoms, like seed thrown from a sower's hand, take root in the hearts of fathers and mothers, and uncles and aunts, and guardians and wardens, and turns them all, but for Christmas Eve only, into Santa Clauses.

"One Christmas morning," says a French author, "when I was in my eighth year, as I was searching in my sabots, I pulled out two big pennies, which made me bitterly unhappy. Where had Father Christmas, the fairy giver of toys, unearthed this horrid, greasy money? Certainly not from heaven. I immediately suspected that my father had placed this prosaic money in my shoe simply to destroy my faith in the legend of Father Christmas. My faith in dear old Father Christmas and his donkey was completely shattered, and it was from that moment that doubt entered my infant soul for the first time."

But this little boy should have said to himself: "No doubt my father put these pennies in my shoe; nevertheless, he does not put pennies there every night in the year, and so it must have been Santa Claus who made him to do it."

And this, you will see, is the true explanation of Santa Claus. Perhaps it is only in very old-fashioned, out-of-the-way places that Father Christmas really rides about on a donkey, and climbs on to roofs, and descends down the chimney with his sack of toys. But if there had never been a Saint Nicholas (who was a real man) no stockings and no sabots—as the French call their shoes—would ever have been set out on Christmas Eves for surprise gifts. So it is still a mystery, and it is still from heaven that this mystery comes.

If you keep half an eye open this Christmas Eve and see, while you pretend to be fast asleep, your father and mother enter the room with candles and parcels of toys, sweets, and oranges, just say to yourself that Santa Claus is *employing* them to do his will, and that if

St. Nicholas had not lived and done kindly things you would never have had that box of soldiers, that Noah's Ark, that farmyard, that grocer's shop, that doll, that box of chocolates, that pair of reins, that book of fairy-tales, those crackers, and that box of candied fruit.

called him Saint Nicholas. He died and was buried like any ordinary man. But one man, whom men called Nicholas, has from his grave, for hundreds of years, inspired the whole civilised world to be kind and generous on Christmas Eve. He was not a mighty warrior,

AN OLD GENTLEMAN IN A RED CLOAK CARRIED ON HIS BACK A SACK STUFFED WITH TOYS

Is it not much more mysterious than Santa Claus himself? Do not think that you are very sharp and clever to have found out how the toys and sweets come to you on Christmas Eve. It is one of the great mysteries of life.

For once upon a time there lived a rich young man who tried, because he so much admired the kind and gentle character of Christ, to make his money make other people happy. He went about placing coins and gifts in the homes of poor people. He did good in secret. The name of this young man was Nicholas. When he died people

but he has done more for the happiness, kindness, and good-humour of the world than Cæsar or Napoleon. Is that not a far greater mystery than Santa Claus and his donkey?

Learn from this story that a beautiful character is more powerful than any fairy, and understand that your presents at Christmas are given to you in secret only that you, when you grow up, may follow the example of Saint Nicholas, and give without telling.

Santa Claus, even if he come in your father's or your mother's body, is still the loving spirit of the good Nicholas.

THE NEXT STORIES WILL BEGIN ON PAGE 2166

GOD REST YOU, MERRY GENTLEMEN!

Carol-singing at Christmas-time is, of course, a very ancient custom. Long ago the carols were purely religious hymns, expressing joy for the birth of the Saviour Christ, but in the course of time all sorts of merry tunes specially composed for singing at Christmas-time came to be known as carols. This is one of the oldest carols, and it tells the story of Christ in simple verses. It has been sung in England for centuries, and there are many different versions of the carol, but that given here is perhaps the best.

CONTINUED FROM 2128

God rest you, merry gentlemen,
Let nothing you dismay;
For Jesus Christ, our Saviour,
Was born upon this day,
To save us all from Satan's power,
When we were gone astray.

O tidings of comfort and joy,
For Jesus Christ, our Saviour, was
Born on Christmas Day.

In Bethlehem, in Jewry,
This blessed Babe was born,
And laid within a manger
Upon this blessed morn;
The which His mother Mary
Nothing did take in scorn.
O tidings, etc.

From God, our Heavenly Father,
A blessed Angel came,
And unto certain shepherds
Brought tidings of the same;
How that in Bethlehem was born
The Son of God by name.
O tidings, etc.

"Fear not," then said the Angel,
"Let nothing you affright;
This day is born a Saviour,
Of virtue, power and might,
So frequently to vanquish all
The friends of Satan quite."
O tidings, etc.

The shepherds, at those tidings,
Rejoiced much in mind,
And left their flocks a-feeding
In tempest, storm, and wind;
And went to Bethlehem straightway
The Son of God to find.
O tidings, etc.

But when to Bethlehem they came,
Whereat this Infant lay,
They found Him in a manger,
Where oxen feed on hay;
His mother Mary kneeling,
Unto the Lord did pray.
O tidings, etc.

Now to the Lord sing praises,
All you within this place,
And with true love and brotherhood
Each other now embrace;
This holy tide of Christmas
All others doth deface.

O tidings of comfort and joy,
For Jesus Christ, our Saviour, was
Born on Christmas Day.

OLD CHRISTMAS

The very spirit of the old-fashioned Christmas which unhappily has largely passed away, breathes again in these graphic verses from the pen of the great Sir Walter Scott. In the twenty-sixth line the word "underogating" means that the nobleman, "without losing his dignity," may at this festal season play at games with the humble villager.

HEAP on more wood!—the wind is chill :
But let it whistle as it will,
We'll keep our Christmas merry still.

Each age has deem'd the new-born year
The fittest time for festal cheer ;
And well our Christian sires of old
Loved when the year its course had roll'd,
And brought blithe Christmas back again
With all his hospitable train.
Domestic and religious rite
Gave honour to the holy night ;
On Christmas Eve the bells were rung ;
On Christmas Eve the mass was sung :
That only night in all the year,
Saw the stoled priest the chalice rear.
The damsel donn'd her kirtle sheen,
The hall was dress'd with holly green ;
Forth to the wood did merry-men go,
To gather in the mistletoe.
Then open'd wide the baron's hall
To vassal, tenant, serf, and all ;
Power laid his rod of rule aside,
And Ceremony doff'd his pride.
The heir, with roses in his shoes,
That night might village partner choose ;
The lord, underogating, share
The vulgar game of "post and pair."
All hail'd, with uncontroll'd delight
And general voice, the happy night,
That to the cottage, as the crown,
Brought tidings of Salvation down.

The fire, with well-dried logs supplied,
Went roaring up the chimney wide ;
The huge hall-table's oaken face,
Scrubb'd till it shone, the day to grace,
Bore then upon its massive board
No mark to part the squire and lord.
Then was brought in the lusty brawn,
By old blue-coated serving-man ;
Then the grim boar's head frown'd on high,
Crested with bays and rosemary.
Well can the green-garb'd ranger tell,
How, when, and where, the monster fell ;
What dogs before his death he tore,
And all the baiting of the boar.
The wassail round, in good brown bowls,
Garnish'd with ribbons, blithely trowls.
There the huge sirloin reek'd ; hard by
Plum-porridge stood, and Christmas pie ;
Nor fail'd old Scotland to produce,
At such high tides, her savoury goose.
Then came the merry-makers in,
And carols roar'd with blithesome din ;
If unmelodious was the song,
It was a hearty note, and strong.
Who lists may in their mumming see
Traces of ancient mystery ;
White shirts supplied the masquerade,
And smutted cheeks the visors made ;—
But, O! what maskers, richly dight,
Can boast of bosoms half so light!
England was merry England, when
Old Christmas brought his sports again.
'Twas Christmas broach'd the mightiest ale;
'Twas Christmas told the merriest tale ;
A Christmas gambol oft could cheer
The poor man's heart through half the year.

CHRISTIANS, AWAKE!

This famous carol was written by John Byrom, who was born at Kelsal in 1691, and died at Mancnester in 1763. Most of his poetry is humorous, but this beautiful song he wrote in 1745 for his little daughter, Dorothy. He had promised to write her something for Christmas, and on Christmas morning she found the manuscript of "Christians, Awake!" among her presents. But the title he had given to the poem was "Christmas Day for Dolly."

CHRISTIANS, awake! Salute the happy morn,
Whereon the Saviour of mankind was born.
Rise to adore the mystery of love,
Which hosts of angels chanted from above ;
With them the joyful tidings first begun
Of God Incarnate and the Virgin's Son.

Then to the watchful shepherds it was told,
Who heard the angelic herald's voice,
"Behold,
I bring good tidings of a Saviour's birth
To you and all the nations upon earth :
This day hath God fulfill'd His promised word,
This day is born a Saviour, Christ the Lord."

He spake; and straightway the celestial choir
In hymns of joy, unknown before, conspire.
The praises of redeeming love they sang,
And Heaven's whole orb with Alleluias rang:
God's highest glory was their anthem still,
Peace upon earth, and unto men good will.

To Bethlehem straight the enlighten'd shepherds ran,
To see the wonder God had wrought for man ;
And found, with Joseph and the Blessed Maid,
Her Son, the Saviour, in a manger laid.
Then to their flocks, still praising God, return,
And their glad hearts with holy rapture burn.

O may we keep and ponder in our mind
God's wondrous love in saving lost mankind.
Trace we the Babe, who hath retrieved our loss,
From His poor manger, to His bitter Cross ;
Tread in His steps, assisted by His grace,
Till man's first heavenly state again takes place.

Then may we hope, the angelic hosts among,
To sing, redeem'd, a glad triumphal song :
He that was born upon this joyful day,
Around us all His glory shall display ;
Saved by His love, incessant we shall sing
Eternal praise to Heav'n's Almighty King.

CHRISTMAS MORNING

Edwin Waugh, who was born in 1817 and died in 1890, was a famous writer in the Lancashire dialect, but he also wrote in proper English, though his best poems were in the quaint words of Lancashire. In this English poem he expresses very brightly the spirit of Christmas, which breathes of thankfulness for the birth of Christ.

COME, all ye weary wanderers,
Beneath the wintry sky;
This day forget your worldly cares
And lay your sorrows by.
Awake and sing,
The church bells ring,
For this is Christmas morning!

With grateful hearts salute the morn,
And swell the streams of song
That laden with great joy are borne
The willing air along;
The tidings thrill
With right good will,
For this is Christmas morning!

We'll twine the fresh green holly wreath,
And make the Yule log glow,
And gather gaily underneath
The glistening mistletoe;
All blithe and bright,
By the glad firelight,
For this is Christmas morning!

Come, sing the carols old and true,
That mind us of good cheer,
And, like a heavenly fall of dew,
Revive the drooping year.
And fill us up
A wassail-cup;
For this is Christmas morning!

To all poor souls we'll strew the feast
With kindly heart and free;
One Father owns us, and at least
To-day we'll brothers be.
Away with pride,
This holy tide,
For it is Christmas morning!

So now, God bless us, one and all,
With hearts and hearthstones warm;
And may He prosper great and small,
And keep us out of harm,
And teach us still
His sweet good will
This merry Christmas morning!

In the field with their flocks abiding,
They lay on the dewy ground,
And glimmering under the starlight
The sheep lay white around.
When the light of the Lord streamed o'er them,
And, lo! from the heaven above
An angel leaned from the glory,
And sang his song of love;
He sang, that first sweet Christmas,
The song that shall never cease:
"Glory to God in the highest,
On earth goodwill and peace!

"To you in the city of David
A Saviour is born to-day,"
And suddenly a host of the heavenly ones
Flashed forth to join the lay.
O never hath sweeter message
Thrilled home to the souls of men;
And the heavens themselves had never heard
A gladder choir till then;
For they sang that Christmas carol
That never on earth shall cease:
"Glory to God in the highest,
On earth goodwill and peace!"

And the shepherds came to the manger,
And gazed on the Holy Child;
And calmly o'er that rude cradle
The virgin mother smiled.
And the sky, in the starlit silence,
Seemed full of the angel lay:
"To you in the city of David
A Saviour is born to-day."
O, they sang—and I ween that never
The carol on earth shall cease:
"Glory to God in the highest,
On earth goodwill and peace!"

A HYMN ON THE NATIVITY OF MY SAVIOUR

Ben Jonson was one of the great Elizabethan poets and dramatists, a friend of Shakespeare, a strong, old-English type of man, yet he could soften under the influence of the "sweet story of old" to the writing of this tender and beautiful song of praise for the birth of Christ. There is a fine sense of reverence and humility in Ben Jonson's "Hymn."

I SING the Birth was born to-night,
The Author both of life and light;
The angels so did sound it.
And like the ravish'd shepherds said,
Who saw the light, and were afraid,
Yet search'd, and true they found it.

The Son of God, th' eternal King,
That did us all salvation bring,
And freed the soul from danger;
He whom the whole world could not take,
The Word, which heaven and earth did make,
Was now laid in a manger.

The Father's wisdom will'd it so,
The Son's obedience knew no "No,"
Both wills were in one stature;
And as that wisdom hath decreed,
The Word was now made flesh indeed,
And took on Him our nature.

What comfort by Him do we win,
Who made Himself the price of sin,
To make us heirs of glory!
To see this Babe, all innocence,
A Martyr born in our defence;
Can man forget this story?

LITTLE CHILDREN, WAKE AND LISTEN!

To be simple in words and thought is all that a Christmas hymn need be in order to be well worth singing, for the story of Christ's coming to earth is all the sweeter the simpler it is told. This little hymn for Christmas morning is well written, and is taken from "Williamson's Children's Manual," published in 1876.

LITTLE children, wake and listen!
Songs are breaking o'er the earth;
While the stars in heaven glisten,
Hear the news of Jesus' birth.

Long ago, to lonely meadows
Angels brought the message down;
Still each year, through midnight shadows,
It is heard in every town.

What is this that they are telling,
Singing in the quiet street?
While their voices high are swelling,
What sweet words do they repeat?

Words to bring us greater gladness,
Though our hearts from care are free;
Words to chase away our sadness,
Cheerless though our hearts may be.

Christ has left His throne of glory,
And a lowly cradle found;
Well might angels tell the story,
Well may we their words resound.

Little children, wake and listen!
Songs are ringing through the earth;
While the stars in heaven glisten,
Hail with joy your Saviour's birth.

JEALOUS JACK FROST

Mr. Frederic E. Weatherly, the author of this little poem, in which he describes very quaintly one of the unhappy results of the visits of Jack Frost, is a well-known writer of songs which are set to music by our leading composers.

JACK FROST went out on a wintry day,
And he heard a bird singing so blithe and gay;
And he stopped and stared with scorn on his brow
Where the little bird sang on the bare bleak bough.

"Now why are you singing, you bird?" he cried,
"I never could sing, though I've often tried."
And the little bird nodded his head in glee:
"Because I am happy, I sing," said he.

"But why are you happy?" said Jack to the bird.
"I never am happy; it's so absurd."
Then louder the little bird sang in glee:
"Because I love and am loved," said he.

Then Jack in a terrible temper flew,
And a cold, long blast on the bird he blew;
And there on the ground he laid him low,
Mute and dead in the cold, cold snow.

ONCE IN ROYAL DAVID'S CITY

No Christmas hymn written in our own day is more popular than this beautiful poem by Mrs. Alexander, who was born in 1818 and died in 1895. She wrote many fine poems for children, chiefly on religious subjects. Mrs. Alexander was the wife of the Bishop of Derry.

ONCE in royal David's city
Stood a lowly cattle shed,
Where a Mother laid her Baby
In a manger for His bed;
Mary was that Mother mild,
Jesus Christ her little Child.

He came down to earth from Heaven
Who is God and Lord of all,
And His shelter was a stable,
And His cradle was a stall;
With the poor, and mean and lowly,
Lived on earth our Saviour holy.

And, through all His wondrous Childhood,
He would honour and obey,
Love, and watch the lowly Maiden
In whose gentle arms He lay;
Christian children all must be
Mild, obedient, good as He.

For He is our childhood's pattern,
Day by day like us He grew;
He was little, weak, and helpless,
Tears and smiles like us He knew.
And He feeleth for our sadness,
And He shareth in our gladness.

And our eyes at last shall see Him,
Through His own redeeming love;
For that Child so dear and gentle
Is our Lord in Heav'n above.
And He leads His children on
To the place where He is gone.

Not in that poor lowly stable,
With the oxen standing by,
We shall see Him; but in Heaven,
Set at God's right hand on high;
When like stars His children crown'd
All in white shall wait around.

THE BIRTH OF CHRIST

There is real expression of joy and gladness in this hymn by S. C. Hamerton. It is well fitted for the voices of the young.

WAKEN, Christian children!
Up and let us sing,
With glad voice, the praises
Of our new-born King.

Up! 'Tis meet to welcome
With a joyous lay:
Christ, the King of Glory,
Born for us to-day.

Come, nor fear to seek Him,
Children though we be;
Once He said of children:
"Let them come to Me."

In a manger lowly
Sleeps the Heavenly Child;
O'er Him fondly bendeth
Mary, mother mild.

Far above that stable,
Up in heaven so high,
One bright star outshineth,
Watching silently.

Fear not then to enter,
Though we cannot bring
Gold, or myrrh, or incense,
Fitting for a King

Gifts He asketh richer,
Offerings costlier still;
Yet may Christian children
Bring them if they will.

Brighter than all jewels
Shines the modest eye;
Best of gifts, He loveth
Infant purity.

Haste we then to welcome,
With a joyous lay,
Christ, the King of Glory,
Born for us to-day.

RING OUT, WILD BELLS

One of Lord Tennyson's greatest works is a very long poem called "In Memoriam." It is really a whole series of poems in which, over a period of several years, the poet mourns for the loss of a dear friend, Arthur Henry Hallam. The varying seasons of each year are described by the poet, and always he expresses the thoughts which the seasons brought to him while still thinking of his dead friend. In these verses it is the end of the year again, and we see that the poet is rejoiced by the music of the midnight bells that ring out the Old Year and ring in the New. He seems to hear in them promise of a brighter day, and, oh, it would be well with the world if the glorious vision of the poet were to come true. But it is ennobling thus to have our minds filled with such thoughts as Tennyson found in the music of the bells

RING out, wild bells, to the wild sky,
The flying cloud, the frosty light:
The year is dying in the night;
Ring out, wild bells, and let him die.

Ring out the old, ring in the new,
Ring, happy bells, across the snow:
The year is going, let him go;
Ring out the false, ring in the true.

Ring out the grief that saps the mind,
For those that here we see no more;
Ring out the feud of rich and poor,
Ring in redress to all mankind.

Ring out a slowly dying cause,
And ancient forms of party strife;
Ring in the nobler modes of life,
With sweeter manners, purer laws.

Ring out the want, the care, the sin,
The faithless coldness of the times;
Ring out, ring out my mournful rhymes,
But ring the fuller minstrel in.

Ring out false pride in place and blood,
The civic slander and the spite;
Ring in the love of truth and right,
Ring in the common love of good.

Ring out old shapes of foul disease;
Ring out the narrowing lust of gold.
Ring out the thousand wars of old;
Ring in the thousand years of peace.

Ring in the valiant man and free,
The larger heart, the kindlier hand;
Ring out the darkness of the land,
Ring in the Christ that is to be.

DEATH OF THE OLD YEAR

In this fine poem Lord Tennyson sounds none of the Christmas joy bells, nor yet a welcome to the New Year. His purpose is to express the feeling of sorrow that comes uppermost in all our hearts as the Old Year goes out. By picturing the Old Year as an actual friend who dies, the poet succeeds in making us feel keen sorrow for its departure.

FULL knee-deep lies the winter snow,
And the winter winds are wearily sighing:
Toll ye the church bell sad and slow,
And tread softly and speak low,
For the Old Year lies a-dying.

Old Year, you must not die;
You came to us so readily,
You lived with us so steadily,
Old Year, you shall not die.

He lieth still; he doth not move,
He will not see the dawn of day.
He hath no other life above.
He gave me a friend, and a true, true love,
And the New Year will take 'em away.

Old Year, you must not go;
So long as you have been with us,
Such joy as you have seen with us,
Old Year, you shall not go.

He froth'd his bumpers to the brim;
A jollier year we shall not see.
But tho' his eyes are waxing dim,
And tho' his foes speak ill of him,
He was a friend to me.

Old Year, you shall not die;
We did so laugh and cry with you,
I've half a mind to die with you,
Old Year, if you must die.

He was full of joke and jest,
But all his merry quips are o'er.
To see him die, across the waste
His son and heir doth ride post-haste.
But he'll be dead before.

Everyone for his own.
The night is starry and cold, my friend,
And the New Year blithe and bold, my friend,
Comes up to take his own.

How hard he breathes! over the snow
I heard just now the crowing cock.
The shadows flicker to and fro;
The cricket chirps: the light burns low;
'Tis nearly twelve o'clock.

Shake hands before you die.
Old Year, we'll dearly rue for you;
What is it we can do for you?
Speak out before you die.

His face is growing sharp and thin
Alack! our friend is gone.
Close up his eyes; tie up his chin;
Step from the corpse, and let him in
That standeth there alone,

And waiteth at the door.
There's a new foot on the floor, my friend,
And a new face at the door, my friend,
A new face at the door.

LITTLE VERSES FOR VERY LITTLE PEOPLE

BOUNCE BUCKRAM, velvet's dear;
Christmas comes but once a year.

RIDE away, ride away, Johnny shall ride,
And he shall have pussy-cat tied to one side,
And he shall have little dog tied to the other,
And Johnny shall ride to see his grandmother.

MY maid Mary
She minds her dairy,
While I go a-hoeing and mowing each morn.

Merrily run the reel
And the little spinning-wheel,
Whilst I am singing and mowing my corn.

WHAT is the rhyme for porringer?
The King he had a daughter fair,
And gave the Prince of Orange her.

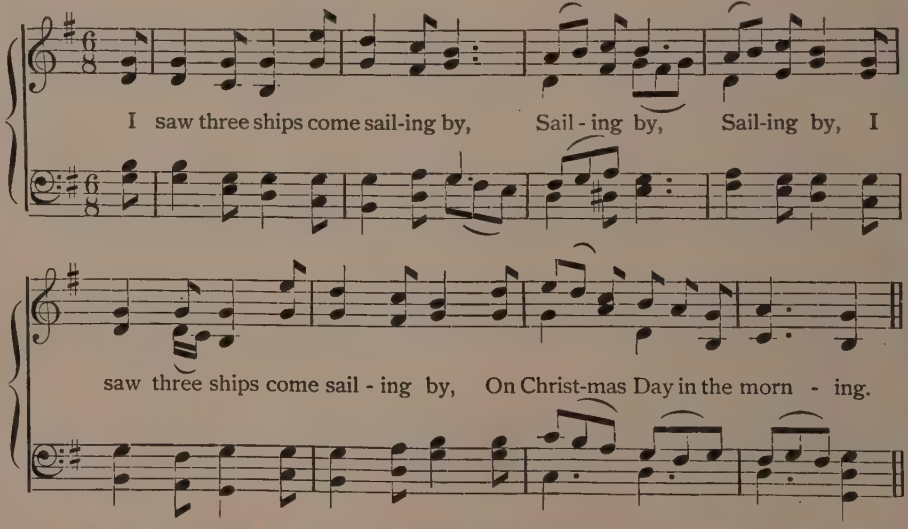
I SAW THREE SHIPS

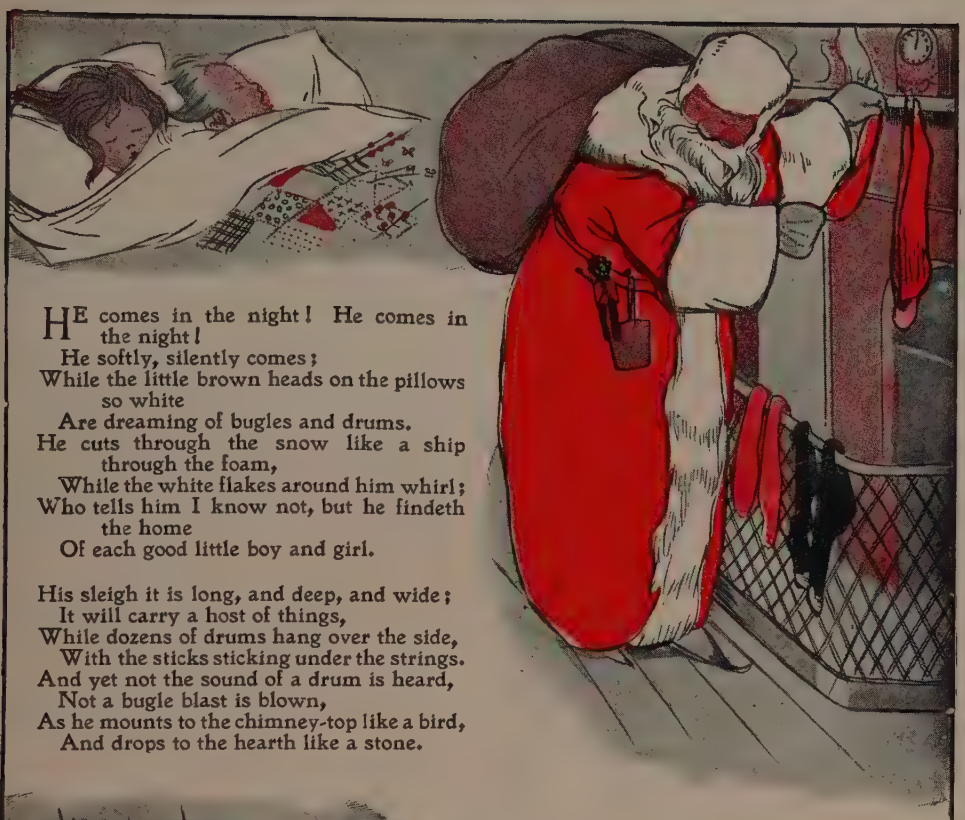
I SAW three ships come sailing by,
Sailing by, sailing by,
I saw three ships come sailing by,
On Christmas Day in the morning.

And what do you think was in them then,
In them then, in them then?
And what do you think was in them then,
On Christmas Day in the morning?

Three pretty girls were in them then,
In them then, in them then,
Three pretty girls were in them then,
On Christmas Day in the morning.

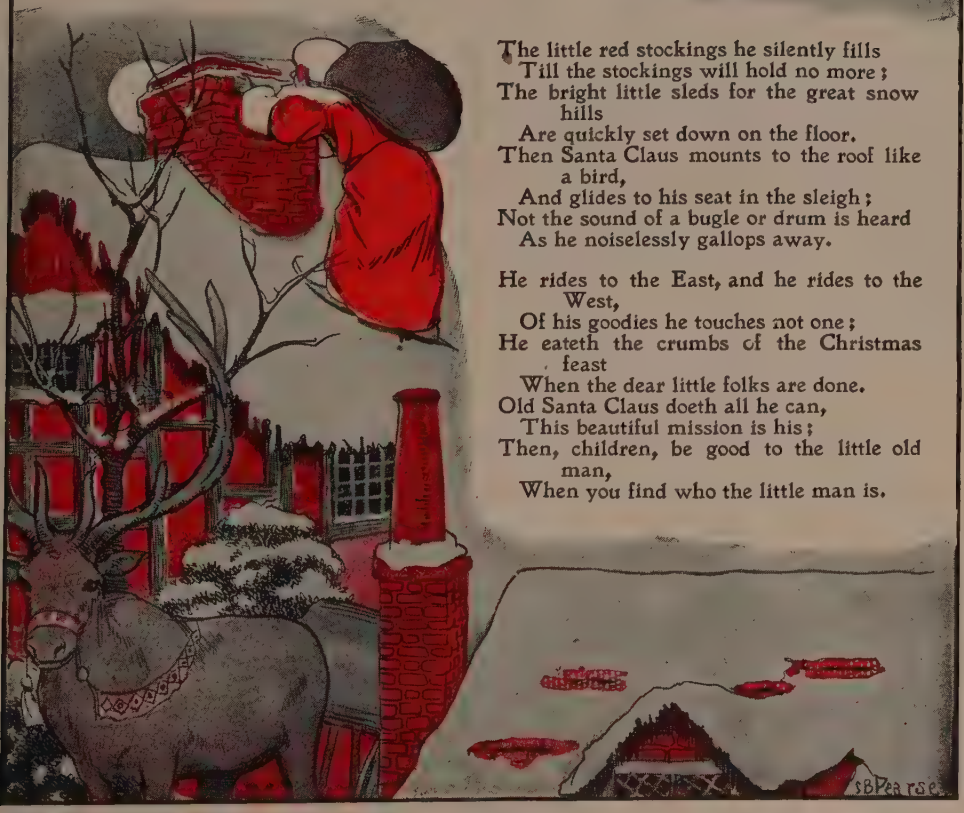
And one could whistle and one could sing,
And one could play on the violin,
Such joy there was at my wedding,
On Christmas Day in the morning.





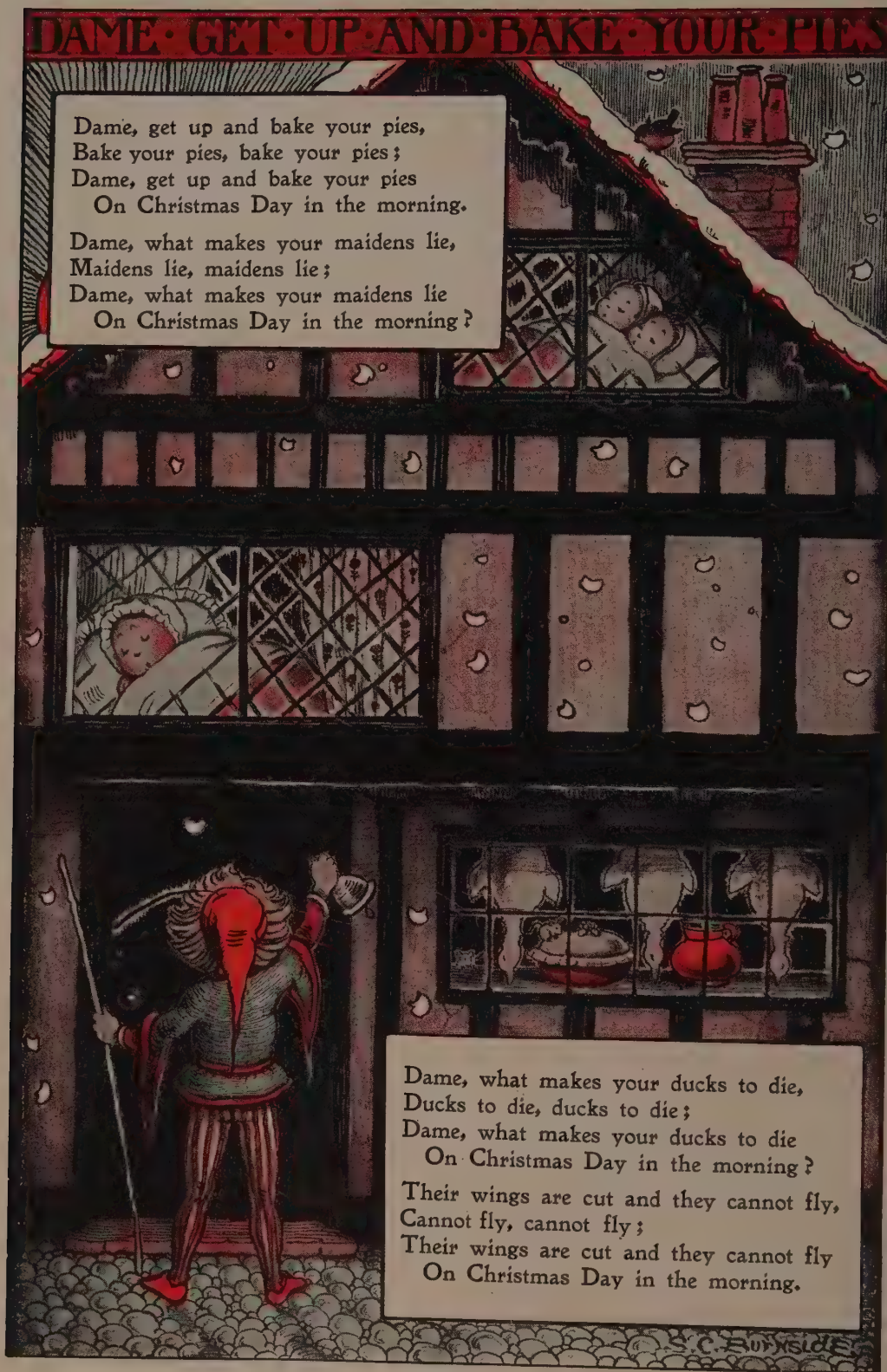
HE comes in the night! He comes in the night!
He softly, silently comes;
While the little brown heads on the pillows so white
Are dreaming of bugles and drums.
He cuts through the snow like a ship through the foam,
While the white flakes around him whirl;
Who tells him I know not, but he findeth the home
Of each good little boy and girl.

His sleigh it is long, and deep, and wide;
It will carry a host of things,
While dozens of drums hang over the side,
With the sticks sticking under the strings.
And yet not the sound of a drum is heard,
Not a bugle blast is blown,
As he mounts to the chimney-top like a bird,
And drops to the hearth like a stone.



The little red stockings he silently fills
Till the stockings will hold no more;
The bright little sleds for the great snow hills
Are quickly set down on the floor.
Then Santa Claus mounts to the roof like a bird,
And glides to his seat in the sleigh;
Not the sound of a bugle or drum is heard
As he noiselessly gallops away.

He rides to the East, and he rides to the West,
Of his goodies he touches not one;
He eateth the crumbs of the Christmas feast
When the dear little folks are done.
Old Santa Claus doeth all he can,
This beautiful mission is his;
Then, children, be good to the little old man,
When you find who the little man is.


DAME · GET · UP · AND · BAKE · YOUR · PIES
Dame, get up and bake your pies,
Bake your pies, bake your pies;
Dame, get up and bake your pies
On Christmas Day in the morning.
Dame, what makes your maidens lie,
Maidens lie, maidens lie;
Dame, what makes your maidens lie
On Christmas Day in the morning?
Dame, what makes your ducks to die,
Ducks to die, ducks to die;
Dame, what makes your ducks to die
On Christmas Day in the morning?
Their wings are cut and they cannot fly,
Cannot fly, cannot fly;
Their wings are cut and they cannot fly
On Christmas Day in the morning.
S. C. Burnside

Merry are the bells, and merry would they ring,
Merry was myself, and merry could I sing;
With a merry ding-dong, happy, gay, and free,
And a merry sing-song, happy let us be!

Waddle goes your gait, and hollow are your hose;
Noddle goes your pate, and purple is your nose;
Merry is your sing-song, happy, gay, and free;
With a merry ding-dong, happy let us be!

Merry have we met, and merry have we been;
Merry let us part, and merry meet again;
With our merry sing-song, happy, gay, and free,
With a merry ding-dong, happy let us be!

MARLEY'S GHOST APPEARING TO OLD SCROOGE

When old Scrooge went home on Christmas Eve, after denouncing everything connected with Christmas, he was visited by the ghost of his late partner, who told him that if he valued his future happiness he had better pay heed to what he would be shown by the spirits of Christmas who were coming to visit him.

THE STORIES OF CHARLES DICKENS

WE are now going to read together a number of the famous books of Charles Dickens, and we cannot do better than begin with one of his shorter stories. "A Christmas Carol in Prose" is only a short book written for the Christmas season, but it is one of the most charming stories Dickens ever gave us. It is quite the best Christmas story, and Dickens was the author who made stories of this kind popular. He wrote it for the Christmas of 1842, and it touched the hearts of all who read it. "It seems to me a national benefit, and to every man and woman who reads it a personal kindness," said Thackeray, the great novelist who lived at the same time as Dickens. The kind-hearted writer of "A Christmas Carol" is indeed the Father Christmas of literature, and so long as we celebrate the joyous season we shall remember his delightful story, which breathes the very spirit of good-will. Mr. Harry Furniss, the famous artist, has specially illustrated this story for us.

THE OLD MAN NAMED SCROOGE

Being a Christmas Carol in Prose

CONTINUED FROM 2030

THERE was a very dreadful old man named Ebenezer Scrooge. What a fine name for a horrid old man! There never was such an old grumpy, frumpy, ill-tempered, sour, unfriendly old man. He had been in partnership for many years with one named Marley, so his firm was known as Scrooge and Marley. But Marley had been dead for seven years—"as dead as a door-nail"—and Scrooge lived alone and shunned everybody.

He had a clerk in his office named Bob Cratchit, and he only paid the poor fellow—who had a wife and four children—fifteen shillings a week, a wage that scarcely fed his family.

The bare, ill-furnished office that Cratchit sat in was more like a tank than a room, and it was as much as his place was worth to attempt to keep himself warm by putting on a good fire, even in the coldest weather.

Old Scrooge grudged every piece of coal that was burned, and kept the coal-box in his own room. He never gave poor Bob a holiday except on Christmas Day, and he hated the very thought of that day coming round. You really never heard of such a nasty, sour-tempered old man.

His nephew, Fred, was just the reverse—a jolly, good-natured young man, who determined that he would always wish his uncle a merry Christmas, no matter how he was snubbed by him. It was Christmas Eve, and into the office of Scrooge and Marley popped the jolly nephew, saying brightly to old Scrooge: "A merry Christmas, uncle! God save you!"

"Bah!" said Scrooge. "Humbug!"

"Christmas a humbug, uncle!" said Scrooge's nephew. "You don't mean that, I am sure."

"I do," said Scrooge. "Merry Christmas! What right have you to be merry? What reason have you to be merry? You're poor enough!"

"Come, then," returned the nephew gaily; "what right have you to be dismal? What reason have you to be morose? You're rich enough!"

Scrooge, having no better answer ready on the spur of the moment, said "Bah!" again, and followed it up with "Humbug!"

"Don't be cross, uncle!" said the nephew.

"What else can I be," returned the uncle, "when I live in such a world of fools as this? Merry Christmas! Out upon merry Christmas! What's Christmas-time to you but a time for paying bills without money; a time for finding yourself a year older, but not an hour richer; a time for balancing your books and having every item in 'em through a round dozen of months presented dead against you? If I could work my will," said Scrooge indignantly, "every idiot who goes about with 'Merry Christmas'

OLD FEZZIWIG'S CHRISTMAS BALL

The Ghost of Christmas Past shows Scrooge his old master Fezziwig making everybody happy at Christmas.

on his lips should be boiled with his own pudding, and buried with a stake of holly through his heart. He should!"

"Uncle!" pleaded the nephew.

"Nephew!" returned the uncle sternly. "Keep Christmas in your own way, and let me keep it in mine!"

"Keep it!" repeated Scrooge's nephew. "But you don't keep it!"

"Let me leave it alone, then," said Scrooge. "Much good may it do you! Much good it has ever done you!"

And so he went on, denouncing Christmas in a frightful way and refusing utterly to say a good word about it or anybody or anything, until his good-natured nephew went away. Two gentlemen who called later in the day for a subscription on behalf of the poor were, of course, turned out without a penny. There were workhouses. What more did the poor want? Old Scrooge would think himself mad to waste his money on them or on anybody, and poor Bob Cratchit was told to be in all the earlier at work on Boxing Day, as he was having Christmas Day off, which was equal to stealing so much of his employer's time. What an old skin-flint!

THE STRANGE THINGS THAT HAPPENED TO OLD SCROOGE ON CHRISTMAS EVE

Now, when the old curmudgeon went home that night to the dismal chambers he occupied—they had formerly been the rooms of his dead partner Marley—he was amazed to notice that the knocker on the door was—old Marley's face! This was queer. But the old fellow went up the dark stairs as boldly as he could, and entered his dark, dreary, dismal rooms. Darkness was cheap, and so he liked it, the old miser!

"Sitting-room, bedroom, lumber-room. All as they should be. Nobody under the table, nobody under the sofa; a small fire in the grate, spoon and basin ready, and the little saucepan of gruel upon the hob, for Scrooge had a cold in his head. Nobody under the bed; nobody in the closet; nobody in his dressing-gown, which was hanging up in a suspicious attitude against the wall. Lumber-room as usual—old fire-guard, old shoes, two fish-baskets, washing-stand on three legs, and a poker.

"Quite satisfied, he closed the door, and locked himself in—double-locked himself in, which was not his custom. Thus secured against surprise, he took off his cravat, put on his dressing-gown and slippers, and his nightcap, and sat down before the fire to take his gruel."

As he sat looking at the low fire, he suddenly realised that every tile about the grate had on it a copy of old Marley's face staring at him. He now began to feel very creepy, you may be sure.

HOW THE GHOST OF OLD MARLEY CAME TO SCROOGE AND WHAT IT TOLD HIM

There was an old bell high up in the room, and it began to ring, while a noise downstairs made him start, and the sound of someone coming to his room made him quiver in every limb, and, behold, the ghost of old Marley walked into his dismal room, with a long, heavy chain dragging from his waist.

When Scrooge summoned up courage to speak to the ghost, it told him that the chain was all the misdeeds and unkind actions of which he had been guilty, and that Scrooge himself was making a chain which would be an awful weight to him when he was dead. The ghost also told him that he would be visited by three spirits, the first coming at one o'clock in the morning; and if he valued his future peace he had better take the advice he had given him and see what the spirits would show him. But old Marley's ghost he would see no more. When it vanished Scrooge looked out of his window and saw many such phantoms with heavy chains about their waists, just as Marley had been burdened. Denouncing the whole thing as "humbug," he lay down on his bed as he was, and was soon asleep.

When he awoke it was still dark, and he had no idea of the time. But while he lay on the bed peering anxiously in the gloom, the curtains were drawn aside by a hand, and the first of the promised spirit-visitors stood before him.

THE GHOST OF CHRISTMAS PAST AND WHAT IT SHOWED THE MISER

"It was a strange figure—like a child; yet not so like a child as like an old man, viewed through some supernatural medium, which gave him the appearance of having receded from the view, and being diminished to a child's proportions. Its hair, which hung about its neck and down its back, was white, as if with age; and yet the face had not a wrinkle in it, and the tenderest bloom was on the skin. The arms were very long and muscular; the hands the

same, as if its hold were of uncommon strength. Its legs and feet, most delicately formed, were, like those upper members, bare. It wore a tunic of the purest white, and round its waist was bound a lustrous belt, the sheen of which was beautiful. It held a branch of fresh green holly in its hand, and, in singular contradiction of that wintry emblem, had its dress trimmed with summer flowers. But the strangest thing about it was that from the crown of its head there sprung a bright, clear jet of light, by which all this was visible; and which was doubtless the occasion of its using, in its duller moments, a great extinguisher for a cap, which it now held under its arm."

THE YEARS ARE ROLLED AWAY AND OLD FEZZIWIG'S BALL COMES BACK AGAIN

He told the miserly old man that he was the Ghost of Christmas Past, and before Scrooge knew it he found himself away many miles, led by the spirit, and back many weary years, seeing his own boyhood's home, as well as many happy scenes he had long forgotten, but was delighted to see again. He was shown some jolly Christmases of long ago, when he was a youth; and, best of all, the spirit took him to the warehouse where he had been an apprentice. When they peeped in Scrooge cried out, on seeing an old gentleman in a Welsh wig, sitting at a high desk:

"Why, it's old Fezziwig! Bless his heart, it's Fezziwig alive again!"

"Old Fezziwig laid down his pen, and looked up at the clock, which pointed to the hour of seven. He rubbed his hands, adjusted his capacious waistcoat, laughed all over himself, from his shoes to his organ of benevolence, and called out in a comfortable, oily, rich, fat, jovial voice:

"'Yo ho, there! Ebenezer! Dick!'

OLD SCROOGE SEES HIMSELF AGAIN AS A HAPPY YOUNG MAN IN THE LONG-AGO

"Scrooge's former self, now grown a young man, came briskly in, accompanied by his fellow-'prentice.

"'Dick Wilkins, to be sure!' said Scrooge to the ghost. 'Bless me, yes. There he is. He was very much attached to me, was Dick. Poor Dick! Dear, dear!'

"'Yo ho, my boys!' said Fezziwig. 'No more work to-night. Christmas Eve, Dick! Christmas, Ebenezer! Let's have the shutters up,' cried old Fezziwig, with a sharp clap of his hands, 'before a man can say Jack Robinson!'

"You wouldn't believe how those two fellows went at it. They charged into the street with the shutters (one, two, three), had 'em up in their places (four, five, six), barred 'em and pinned 'em (seven, eight, nine), and came back before you could have got to twelve, panting like race-horses.

"'Hilli-ho!' cried old Fezziwig, skipping down from the high desk with wonderful agility. 'Clear away, my boys—lads, and let's have lots of room here! Hilli-ho, Dick! Chirrup, Ebenezer!'

"Clear away! There was nothing that they wouldn't have cleared away, or couldn't have cleared away, with old Fezziwig looking on. It was done in a minute. Every movable was packed off, as if it were dismissed from public life for evermore. The floor was swept and watered, the lamps were trimmed, fuel was heaped upon the fire, and the warehouse was as snug and warm and dry and bright a ball-room as you would desire to see upon a winter's night.

THE MERRIEST, JOLLIEST CHRISTMAS PARTY THAT EVER WAS!

"In came a fiddler with a music-book, and went up to the lofty desk and made an orchestra of it, and tuned like fifty stomach-aches. In came Mrs. Fezziwig, one vast substantial smile. In came the three Miss Fezziwigs, beaming and lovable. In came the six young followers whose hearts they broke. In came all the young men and women employed in the business. In came the housemaid, with her cousin, the baker. In came the cook, with her brother's particular friend, the milkman. In came the boy from over the way, who was suspected of not having board enough from his master, trying to hide himself behind the girl from next door but one, who was proved to have had her ears pulled by her mistress. In they all came, one after another—some shyly, some boldly, some gracefully, some awkwardly, some pushing, some pulling. In they all came, anyhow and everyhow.

"Away they all went, twenty couples at once; hands half round and back again the other way; down the middle and up again; round and round in

various stages of affectionate grouping; old top couple always turning up in the wrong place; new top couple starting off again as soon as they got there; all top couples at last, and not a bottom one to help them. When this result was brought about, old Fezziwig, clapping his hands to stop the dance, cried out, 'Well done!' and the fiddler plunged his hot face into a pot of porter, especially provided for that purpose. But, scorning rest, upon his reappearance he instantly began again, though there were no dancers yet, as if the other fiddler had been carried home, exhausted, on a shutter, and he were a bran-new man resolved to beat him out of sight, or perish."

THE MERRY CHRISTMAS DINNER AT THE HOME OF POOR BOB CRATCHIT

And so the jolly party went on until eleven o'clock, when Fezziwig and his wife wished them all a merry Christmas and parted from them as happy as happy could be. Scrooge was so delighted that he began to wish he could meet Bob Cratchit at once; he would not be so rough with him now.

But the ghost took him to another Christmas, when old Marley was lying at death's door and Scrooge was lonely in his office, while happiness was reigning in the home of an old sweetheart of his, who had fortunately married a kindly, good-natured man. There's no saying what else the Ghost of Christmas Past would have shown him had Scrooge not managed to get the extinguisher in his hand, which the ghost had carried all the time, and, by pressing this down upon it, to put out the light of the ghost like a snuffed candle. And he had barely time to reel into bed before he fell into a heavy sleep.

When he awoke again it was still dark outside, but his room was filled with a mysterious ruddy light. The bell struck one. No ghost appeared. Scrooge was trembling with fear. After a while he ventured to get up, and shuffled in his slippers to the door.

"The moment Scrooge's hand was on the lock a strange voice called him by his name, and bade him enter. He

obeyed. It was his own room. There was no doubt about that. But it had undergone a surprising transformation. The walls and ceiling were so hung with living green that it looked a perfect grove, from every part of which bright, gleaming berries glistened.

THE JOLLY GIANT WHO WAS THE GHOST OF CHRISTMAS PRESENT

"The crisp leaves of holly, mistletoe, and ivy reflected back the light, as if so many little mirrors had been scattered there; and such a mighty blaze went roaring up the chimney as that dull hearth had never known in Scrooge's time, or Marley's, or for many and many a winter season gone. Heaped up on the floor, to form a kind of throne, were turkeys, geese, game, poultry, brawn, great joints of meat, sucking-pigs, long wreaths of sausages, mince-pies, plum-puddings, barrels of oysters, red-hot chestnuts, cherry-cheeked apples, juicy oranges, and seething bowls of punch, that made the chamber dim with their delicious steam. In easy state upon this couch there sat a jolly giant, glorious to see, who bore a glowing torch, in shape not unlike Plenty's horn, and held it up, high up, to shed its light on Scrooge, as he came peeping round the door.

"'Come in!' exclaimed the ghost. 'Come in and know me better, man!'

"Scrooge entered timidly, and hung his head before this spirit. He was not the dogged Scrooge he had been, and though the spirit's eyes were clear and kind, he did not like to meet them.

"'I am the Ghost of Christmas Present,' said the spirit. 'Look upon me!'"

HOW THE GHOST TOOK OLD SCROOGE TO THE HOME OF BOB CRATCHIT

This jolly ghost took shivering old Scrooge away on the wings of the wind through the Christmas streets, showed him the home of poor Bob Cratchit, where, with all their poverty, his clerk and his wife and children were happy and delighted around the Christmas goose, and the great steaming plum-pudding, which Mrs. Cratchit had saved for so long and cooked so carefully. And after the dinner was over Bob proposed the toast: "A merry Christmas to us all, my dears; God bless us!" which Mrs. Cratchit, Peter, Belinda, and Martha all echoed, while Tiny Tim said last of all, "God bless us every one!"

Tim was Cratchit's youngest child, a little cripple whose life seemed to hang only by a thread, he was so weak and tiny. Scrooge, who had cruelly said that the death of such children was a good riddance, was now anxious to know if there was any hope for Tiny Tim. He was almost as concerned about him now as if he had been his own child.

But the spirit whirled him on through a colliery village, where poor folk were rejoicing around Christmas fires; to a lighthouse in the stormy sea, where lonely men still wished each other a happy Christmas; to the home of his nephew, Fred, where everything was happiness, and even his own name was spoken not with contempt, but with sorrow and sympathy, because he was not enjoying the season of goodwill.

To many other homes and places the Ghost of Christmas Present took him, showing him misery and want as well as happiness and plenty. But as the bells struck twelve the spirit vanished, and a new and different figure came to him. This was the third and last of his strange, ghostly visitors.

THE APPEARANCE OF THE GHOST OF CHRISTMAS YET TO COME

"I am in the presence of the Ghost of Christmas Yet To Come?" said Scrooge. The spirit answered not, but pointed onward with its hand. "You are about to show me shadows of the things that have not happened, but will happen in the time before us," Scrooge pursued. "Is that so, Spirit?" The upper portion of the garment was contracted for an instant in its folds, as if the spirit had inclined its head. That was the only answer he received.

The mission of this spirit was soon begun, for it showed him his own death and how not a soul was there to mourn his loss; how his death was rather a cause of happiness in some quarters than a sense of loss; but it also showed him how Tiny Tim might die and leave many friends to sorrow for him, because they had loved him, while his memory would endure in their hearts.

In short, old Scrooge had now come to be so affected by all the visions which the three spirits had shown him that he was utterly changed, and when at length the Ghost of Christmas Yet To Come brought him to a neglected gravestone with his own name on it, he was no longer the Scrooge that had

turned his nephew out of his office without wishing him a merry Christmas. He appealed to his spirit-guide for mercy, and promised to alter his life in the future.

"'I will honour Christmas in my heart, and try to keep it all the year. I will live in the Past, the Present, and the Future. The spirit of all three shall strive within me. I will not shut out the lessons that they teach. Oh, tell me I may sponge away the writing on this stone!' In his agony he caught the spectral hand. It sought to free itself, but he was stronger in his entreaty, and detained it. The spirit, stronger yet, repulsed him. Holding up his hands in a last prayer to have his fate reversed, he saw an alteration in the phantom's hood and dress. It shrunk, collapsed, and dwindled down into a bedpost."

Great was Scrooge's delight when he awoke to find it was Christmas Day, and that he was not too late to begin at once. There never was a jollier old gentleman set out to make people happy on Christmas Day. He sent the biggest prize turkey that ever was sold to Bob Cratchit's — sent it in a cab, if you please, to be in time. He met one of the gentlemen who had called for the subscription for the poor, and gave him so big a donation that the gentleman was amazed. "A great many back payments included in it," old Scrooge explained to him. He hied himself to the home of his nephew, and staggered Fred and his wife and her sister and all the others who came to the Christmas party by being the jolliest of the lot.

"Wonderful party, wonderful games, wonderful unanimity, won-der-ful happiness!"

He went early next morning to his office. Bob Crachit was late. Scrooge pretended to be very angry with him for a little, and then playfully dug him in the ribs and said that, as a punishment, he was going to raise his salary!

"A merry Christmas, Bob!" said Scrooge, with an earnestness that could not be mistaken, as he clapped him on the back. "A merrier Christmas, Bob, my good fellow, than I have given you for many a year! I'll raise your salary, and endeavour to assist your struggling family, and we will discuss your affairs this very afternoon over a Christmas bowl of smoking bishop, Bob! Make up the fires, and buy another coal-scuttle before you dot another i, Bob Cratchit!"

Scrooge was better than his word. He did it all, and infinitely more; and to Tiny Tim, who did NOT die, he was a second father.

HOW OLD SCROOGE SURPRISED BOB CRATCHIT

After old Scrooge, the miser, had been visited by the spirits of Christmas, and changed from a miserly into a kind-hearted old man, he went to his office on Boxing Day and, pretending to be very angry with his poor clerk, Bob Cratchit, for coming in late, he dug him playfully in the ribs, saying he would punish him by raising his wages!

The next stories of Famous Books are on 2197.

THE MAN WHO GAVE AWAY

CONTINUED FROM 2148

ONCE upon a time there was a man who lived with one old servant in a little cottage in the country. He had no wife and no children; all his brothers and sisters were dead; besides the old woman who looked after his cottage, made his bed, and cooked his meals, there was no one to be fond of this solitary man.

But he was not unhappy. He had a dog called Don, who was the faithful companion of all his walks. His study was full of beautiful books, which he read with delight. His little garden was bright and fragrant all the year round with flowers, which he cared for himself and loved very dearly. And in the winter he spread bread-crumbs on his window-sill, and robins learned to come into his house and even to eat food out of his hand.

And yet he felt that something was lacking in his life. There was something he needed, he couldn't tell what it was, but something that would complete his simple happiness and fill his quiet life with content. He used to sit quite still at night wondering what this mysterious something could be.

One winter's afternoon, when he was walking through the snow in a lonely country lane with Don, he passed a workman and his wife and their little family, trudging patiently along in search of work. The man carried a little girl in his arms; the woman pushed a shabby baby-carriage, which was full of old clothes; two boys and a girl lagged behind, footsore and tired.

When they had passed, the solitary man said to himself: "I ought to have given them a few coppers; they are very poor; a few cents would have cheered them up. Dear me, it was foolish of me not to have thought of it at the time. Three or four coppers would have made a world of difference to those poor people."

That night he could not sleep for a long time. In the darkness of his bedroom, where a comfortable fire was just beginning to die down, he saw the picture of the workman's family—the little shabby and tired procession of human beings, trudging wearily through the snow.

"Dear me," he kept muttering, "a few cents would have made all the difference to those poor people."

On the next day he unchained Don from the kennel and started out, with the hope of meeting the poor people.

"If I do not meet them," he said, "perhaps I shall meet others just as poor who will be glad of a few coppers."

But he met no one at all.

That night he was really very unhappy. He could not read, he could not write, he could not do anything but sit and think how unhappy he was, because he had met no poor people.

"To-morrow," he said, "I will not walk in the lanes, but in the high-road, and there I shall surely meet some poor people who will be glad of a few cents. I shall never be happy unless I can make other people happy too."

The next day he walked on the high-road, and very soon he met a family of poor people tramping wearily along in search of work. Don barked at them, and his master called him away.

"There," he said, "take that—it will help you along the road, perhaps."

The workman stared open-eyed at the half-dollar, and then, with a bright smile, he exclaimed joyfully: "I feel a new man!" He thanked the giver, and passed on.

"Dear me," said the gentleman, "I ought to have given him a dollar. Those poor little children looked very tired and dreadfully hungry."

"What a lot of poor people!" he exclaimed, as he lay on his bed. "Dear me, what a lot of poor people!" No doubt all those poor people had come to cheer his spirit on its way with a thankful "God bless you!"

"I don't wonder the dog barks at us," said the labourer bitterly; "for we look more like tramps than respectable people."

The gentleman saw what a fine-looking man was this poor labourer, and he saw, too, how cold and hungry looked the children. It struck him that a few cents would not be enough. He must give them more. He put his hand in his pocket and drew out a half-dollar.

He felt unhappy until he met a young widow carrying a child in her arms and leading another by the hand.

"Would a dollar help you along the road?" asked the gentleman, with a kind smile.

The woman's face, which had been grey and sad, became, all of a sudden, glad and animated.

"A dollar!" she exclaimed. "Why, a dollar is heaven!"

The gentleman smiled with pleasure.

"There," said he; "I hope it will make you happy."

"It has made a new woman of me," said the poor widow, staring.

A feeling of great pleasure took possession of the gentleman's heart. "How easy it is," he said that night, "to make oneself extremely happy. I have spent a dollar and a half to-day, and really I never bought anything in my life which gave me so much pleasure. The surprise in their faces when they saw the money—how nice that was! Surprise is a great thing, a very great thing. I like surprising poor people. It is most convenient that a little piece of money should be able to drive despair out of a poor human heart."

Life seemed to him now a much happier matter. He still had his books, his robins, his flowers, and his faithful dog; but in addition to those he had a little secret of happiness all to himself.

He kept seeing in his dreams the light which shone in the faces of the workman and the widow when they saw the silver. He kept hearing the words "I feel a new man" and "It has made a new woman of me."

"Really," he said, when he woke up, "I feel a new man myself."

As he was shaving he suddenly stopped, lowered the razor, and looked at his lathered face in the glass. "If a dollar can make poor people so happy, what would two do?" The idea filled him with pleasure. "And two dollars would certainly make these poor people very happy indeed."

From that day onward, this gentleman, who was not very old and not very rich, made long walks into different parts of the country, and whenever he saw very poor people, who looked as if they wanted to be better and happier, he took two dollars from his pocket, and said to them: "That will help you to feel the sun is still shining." They would call after him: "God bless you, sir!" astonished by his gifts; and those blessings of the very poor became the chief happiness of this once solitary man. He seemed to be always hearing in his ears the words "God bless you!" which are the best words in the world.

He lived to be an old man, and when he could not walk long distances he bought a phæton and a pony, and drove himself along the roads, particularly in wet and cold weather, with a pocket full of two dollar bills.

His old servant would say to him:

"Why, master, what for do you want to go out driving on such a bad day as this? Why, I wouldn't turn a dog out in such miserable weather!"

"Oh, come," he would say, "a little wind and rain is good for the complexion; I want to keep young, Betty; I want to keep young and handsome as long as ever I can."

His face brightened just before his death. "What a lot of poor people!" he exclaimed. "Dear me, what a lot of poor people!" No doubt all those poor people had come to cheer his spirit on its way with a thankful "God bless you!"

THE ANGEL OF THE DIMPLES

An angel, just about to fly away from the world, perceived as it fluttered on the surface of the earth a child, sleeping in some long grass under the shadow of some plants.

"What a lovely child!" exclaimed the angel. "It must have been stolen from heaven."

And to make quite sure that the little creature really belonged to the earth, and that its body was really made as, alas! all earthly bodies are made, of perishable stuff, the angel, with two fingers of its divine hand, fingers which were rosy with the beauty and tint of heaven, touched the baby cheeks.

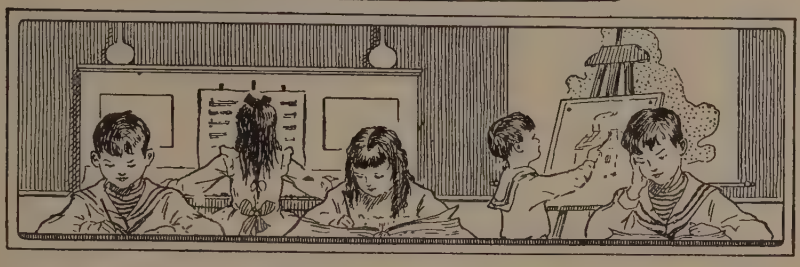
He touched them quite close to the mouth, on each side of the lips, at the place where ends the circle of the smile. Then, reassured, the angel said: "The child is really human, after all." Leaving the child alone, the angel flew away.

But where they had rested, his fingers had left their prints.

That is why, my daughter, my dear little babe, on each of thy cheeks, when thou beginnest to smile, two little dimples appear—two pretty little dimples of the angels!

That is why I so often amuse myself by making thee laugh, just to see thy dimples from the angels of heaven!

CONTINUED ON PAGE 2297



READING

THE DIFFERENCE BETWEEN SUBJECT AND OBJECT

CONTINUED FROM 1936

ONCE upon a time a man was riding along on the back of a donkey. And as he rode he heard people say as they passed by, "Look at that great big man riding on that poor little donkey! What a shame!" At last he could stand it no longer, so he got off and picked the donkey up on his back and carried it along.

But at this all the people laughed so much that he got on again. Every time he rode on the donkey, people said, "How cruel!" and when the donkey rode on him, they said, "How silly!" So at last the poor man went mad.

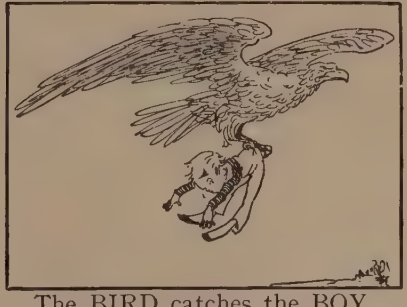
Now, in the first picture the word DONKEY is said to be the Subject, because it does something; and the word MAN is the Object, because the man has something done to him. But in the second one they are turned round—MAN is Subject, and DONKEY is Object.

You see, it makes all the difference whether you are the Subject or the Object, and this is important to remember. Let us take a few more pictures that will help us to understand the difference between the SUBJECT and the OBJECT.

The DONKEY carries the MAN

The BOY catches the BIRD

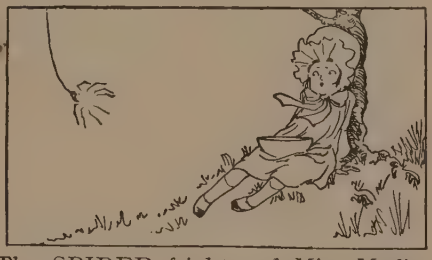
The MAN carries the DONKEY



The BIRD catches the BOY

The LION beat the UNICORN

The UNICORN beat the LION



The SPIDER frightened Miss Muffett

Miss Muffett frightened the SPIDER

These are funny pictures, but they show you very clearly the difference between subject and object.

Now, all this time we have been talking about CASE. The subject is said to be in the subject-ive case, and the object in the object-ive case. But you need not trouble about the names as long as you see quite clearly the difference between your chasing a lion and a lion chasing you. And I think everybody can see that!

There is one more CASE, in addition to the two about which we have been reading. This is called the possess-ive case, because it is used when we wish to say that a person possesses something.

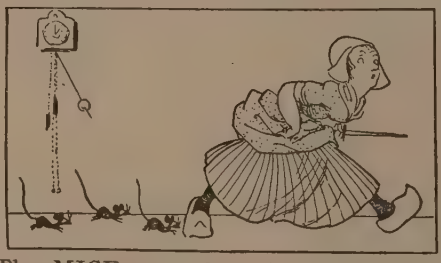
"The BABY'S Rattle" means that the rattle belongs to Baby, and that Baby possesses it; so the word "Baby's" is in the possessive case.

Here are some more of the same kind:

DAVID'S Harp

FATHER'S Watch

And here we have all three cases:

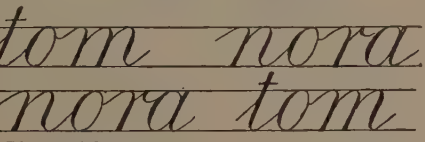


The MICE ran after the FARMER'S WIFE

I wonder if you can pick out the cases here and say which is which.

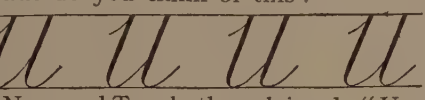
TOM AND NORA WRITE THEIR NAMES

AFTER practising the words their mother had shown them, Tom and Nora found it easy to write their names, and this is what they brought her:



She said they had written and spelt them properly, but that names always begin with a big letter or *capital*, and that they should now learn how to write these.

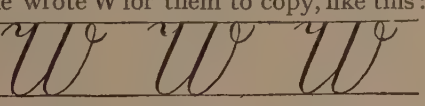
"Some of them," she said, "are very like the small letters you already know. What do you think of this?"



Nora and Tom both exclaimed: "U—a big u!"

As their mother finished making some for them to copy, she showed them how she gave the U a little stroke to help it up so high, and to know it from its little brother u. The pencils had to go down and up so far that it was not always easy to keep the strokes even, but that was the only thing Tom and Nora had to be careful about.

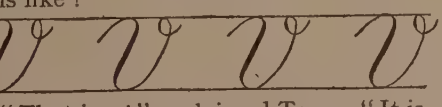
"The next letter is also like a little one grown up. See," said their mother, as she wrote W for them to copy, like this:



"we make a little turn to start the letter at the top. We could make a little stroke as we did for u, but u and w would then be much alike; so we make a little turn something like the curly tail of r and v."

"Yes," said Nora. "It looks as though it wanted something to help it to start."

"That reminds me of the next capital letter," her mother said. "What is this like?"



"That is v!" exclaimed Tom. "It is just a big v, and it will be easy to write."

V was soon written, and then came another capital letter exactly like a small one.

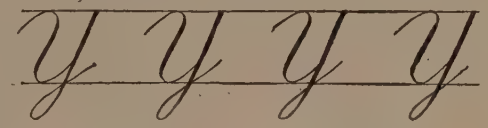
"X!" Tom and Nora exclaimed together, as though they had discovered a toy put away and forgotten.

"How is it, mother, that the capital letters are so easy?" asked Nora.

"They are not all like the small letters," her mother said; "and when I learned to write they were more difficult, because they were made with so many flourishes. But the simpler letters are, the better the writing. Writing is meant to be read, not to puzzle people."

"I see!" said Nora, as she finished her line of x's.

"Capital Y is also like small y. Here it is," said her mother.

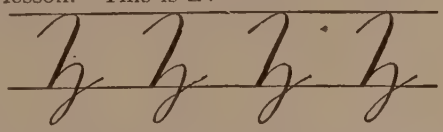


"Yes, that is y," remarked Tom; "and it is like V with a tail. That is easy."

Nora liked making Y because of its curves, and she called it a pretty letter; but Tom found the straight strokes easier to make, and by this time he knew just how heavily to press on the pencil without breaking the point. He was all the more careful because he knew what a hindrance it was to have to stop and sharpen the point.

"We have written U, W, V, X, and Y," said Nora. "They are the last letters of the alphabet. Is Z coming next, mother? If it is we shall know the capital letters of the end of the alphabet first."

"Z is nearly the last of the capital letters that are like small ones, and if we finish with it to-day you will have done well to write six letters in one lesson. This is Z:"



Tom and Nora thought that it, too, was just like the small letter, and they wrote a good line before they put on their hats and went out into the garden.

HOW TO TAKE ONE NUMBER FROM ANOTHER

In our last lesson we learned how to write down any number in figures. As we know, what we mean by "carrying" a figure in an addition problem; we can add together any two numbers, no matter how many figures there may be in each number.

Add together five thousand seven hundred and four; twenty thousand nine hundred and eighty-seven.

The two numbers are 5,704 and 20,987. Writing them so that "ones" come under "ones," "tens" under "tens," and so on, we get:

5,704	Then say: 7 and 4, 11;
20,987	put down 1, carry 1. 1 and
———	8, 9; put down 9. 9 and
26,691	7, 16; put down 6, carry 1.
	1 and 5, 6; put down
	6. Put down 2.

More than two numbers are added together in the same way; the only difference is that we often have to "carry" more than 1. But as long as the sum is carefully set down, so that the "ones" come correctly under one another, the "tens" under the "tens," and so on, there will be no mistakes.

Add together 297, 30,057, 4,209, 28.

297	Say: 8 and 9, 17; and 7,
30,057	24; and 7, 31. Put down
4,209	1, carry 3.
28	3 and 2, 5; and 5, 10;
———	and 9, 19. Put down 9,
34,591	carry 1.
	1 and 2, 3; and 2, 5.

Put down 5. Put down 4. Put down 3.

EXAMPLES.

1. Add together: Twenty-six thousand and two; four hundred and thirty-seven; five thousand three hundred and forty; seventy-eight; nine hundred and four.

2. Add together: 37,259; 4,023; 584,361; 294.

3. Add together: 77,951; 3,141; 203; 5,925; 64.

By *subtraction*, we find how many things are left when we take away one number from another number of things of the same kind.

To subtract 4 from 7 is to find what number is left when 4 is taken from 7. This is *the same thing as finding what number must be added to* 4 *to make* 7.

For the 7 apples are made up of the 4 on the left and the 3 on the right.

First, take away the 4 apples. We have the 3 left. So that 4 *subtracted from* 7 *leaves* 3.

Next, if we have the 4 apples, we must, to make up 7, put the other 3 with them. So that *the number which must be added to* 4 *to make* 7 *is* 3.

To subtract one number from another, we must find what must be *added* to the one number to make the other.

Subtract 3 from 18.

Here we have a number, 3, to which we are to add enough to make 18 together. Now, 18 contains a "ten" and 8 "ones." To make 3 "ones" up to 8 "ones" we must add 5 "ones." Besides this we must add a "ten"; so that in all we have added a "ten" and 5 "ones," or what we call 15.

We set down the working of our sum in this way. Write the numbers under one another just as in addition.

18	Say: 3 and 5 make 8; put down 5.
3	Nothing and 1 ("ten") make 1
—	("ten"); put down 1.
15	

Subtract 9 from 18.

This is a little more difficult, because the number taken away has a greater "ones" figure than the number from which it is taken. But by simple counting we know that we must add another 9 to make 9 into 18.

18	Say: 9 and 9 make 18;
9	put down 9.
—	
9	

Subtract 27 from 45.

45	Say: 7 and 8 make 15; put down
27	8, carry the 1 (which is 1 "ten").
—	By carrying the 1 "ten" we make
18	the 27 up to 37, so that next we
	say 3 and 1 make 4; put down 1.

Subtract 347 from 635.

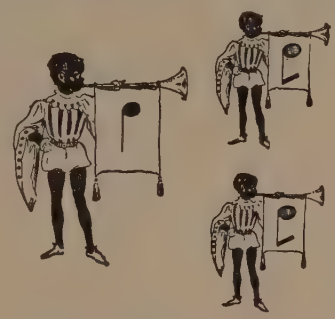
635	Say: 7 and 8 make 15; carry 1
347	(ten). 1 and 4, 5; and 8 make
—	13; carry 1 (hundred). 1 and 3,
288	4; and 2 make 6.

THE STRANGE CAPS THAT THE FAIRIES WEAR

IN our last story of fairyland we found that King Semibreve was the grand person, but two Lords Minim might represent him, and if two Lords Minim failed, four little Masters Crotchet would do quite as well. If you and I walked into the happy rooms where little fairies learn their lessons, we should hear their pretty voices singing :

'Tis Semibreve, the mighty king,
Two Lords Minim for him stand ;
Four Crotchets are the self-same thing
In this, our pretty fairyland.

Then we should see them pull out some very pretty toys, and some very funny caps. The toys are little balls of many different colours, and the caps are of strange and varied make. One cap is like this 𝅝, the very design that the story told us King Semibreve bore on his banner. All the fairies who wear this head-dress have four balls thrown to them, and they have to catch every one. Another cap is like this 𝅗𝅥. Such was the device of the Lords Minim, and all the fairies who wear this strange cap have two balls thrown to them, and they must not fail to catch either one. The third cap is quite like a hatpin ♩, reminding us of the little crotchets, and whosoever wears the same has only to catch one ball. This game is called " The Semibreve, Minim, and Crotchet Frolic."



1 Crotchet equals..... 2 Quavers

Suppose a fairy who wears a little crotchet cap makes up her mind to catch two balls. All the fairies immediately agree that she must be handed a minim cap, because to catch two balls is to be as clever as the fairy who wears a minim cap. Supposing, again, that one of the little fairies with a minim cap catches four balls instead of two, at once she is presented with King Semibreve's symbol 𝅝, because, to catch four balls is to be as clever as the great Semibreve. Again, if the fairy who represents King Semibreve only manages to catch two balls, she will have to take off her cap, and put on the cap of a minim, because, while two balls will do very well for my Lord Minim, they are not enough for his Majesty King Semibreve. And if this same little fairy should prove unfortunate enough to only catch one ball, she would have to be contented with the little hatpin ♩ which in fairy language is called a crotchet. All we have to remember is that *one* ball is not nearly enough for a semibreve, or, indeed, a minim either, but that *one* ball is only enough for little Master Crotchet.

Four balls to a semibreve,
While a minim likes just two ;
One for crotchet, by your leave,
'Tis a game we like—don't you?

" Yes, yes ! " all the fairies cry ; but there is a stir among the little men who wear the crotchet cap, and one little creature steps forward and says :

" What will happen if any of us let a ball fall ? " The voice of the fairy queen gives the reply :

For those of you who are not clever,
A thrilling game is yours for ever ;
A quaver shall your token be,
'Tis drawn just here, 𝅘𝅥𝅮 for you to see.

All the little voices join with ours in asking, " What can a quaver be ? " " Well," the fairy queen has whispered, " whenever we see the picture of a little black boy with a tail like this 𝅘𝅥𝅮, we may be quite sure that the fairy who wears such a device is not able to bear the weight of one ball, and if she is really anxious to carry one of these balls she will call a little fairy to help her, and the two will join together like this 𝅘𝅥𝅮𝅘𝅥𝅮, and so be equal to any merry little crotchet.

So these are the rules of the game :

King Semibreve 𝅝 is worth two minims 𝅗𝅥 𝅗𝅥, and so two minims 𝅗𝅥 𝅗𝅥 represent the great King Semibreve. Four Masters Crotchet ♩ ♩ ♩ ♩ are able to take the place of their king 𝅝, and eight Masters Quaver 𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮 𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮𝅘𝅥𝅮 mean the same thing. Two Masters Crotchet may represent my Lord Minim, and four little men bearing the quaver device 𝅘𝅥𝅮𝅘𝅥𝅮 𝅘𝅥𝅮𝅘𝅥𝅮 will do equally well. Even two little quavers 𝅘𝅥𝅮𝅘𝅥𝅮 can take

the place of one Master Crotchet . So, in fairyland, no one feels too small or too unimportant to help. Do you not think our fairies have found out a very nice game ? If you like it as much as I do, make the paper caps out of pretty coloured paper, and don't forget the balls, because we must catch the right number of balls which each cap requires ; and if, perchance, we have to change our caps, we must be quite sure quickly to find the one that should belong to us.

DRAWING

HOW TO MAKE PATTERNS AND PAINT THEM

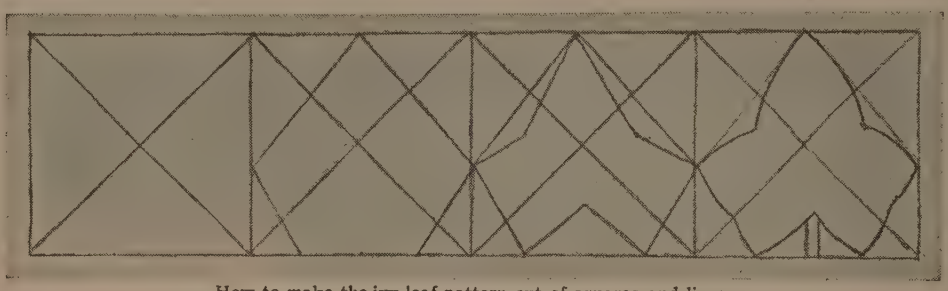
Now we know how to use our pencils and how to draw straight lines, we can learn how to make patterns and paint them, and we shall be able to use the flowers and leaves we have learnt to draw as well.

When people see a nice, clean, smooth piece of sand by the seashore, they like to make drawings on it with their sticks ; children love to put borders of shells and stones from the beach round the castles they dig and build.

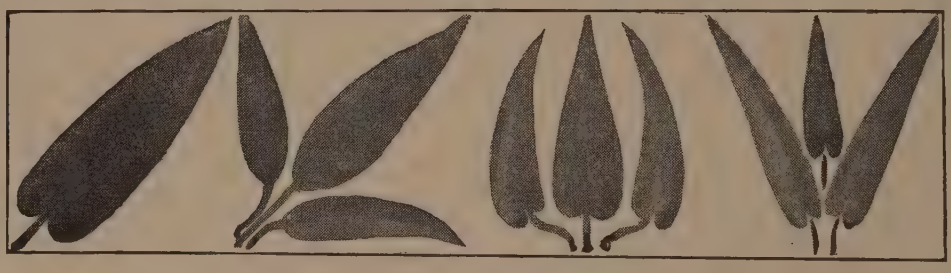
Long, long ago, other little children played with the sand, and other fathers and big brothers liked to carve patterns on their weapons and shields.

When we go to museums we see the wonderful patterns the savages make just out of little lines and dots on the spears and knives they use in war, and we can see the gorgeous paintings the Egyptians made to decorate their tombs and the cups and vases painted so beautifully by the Greeks.

We, too, can make patterns for ourselves out of just little lines, or with lines and dots. Let us take our rulers and rule straight lines, one along the top edge and one along the bottom edge of the ruler, marking the inches with little dots along the top line only. Now we will put the ruler away and make little lines from the dots on the top line downwards, till they meet the bottom line, and we shall have spaces in which to put our pattern.



How to make the ivy-leaf pattern out of squares and lines

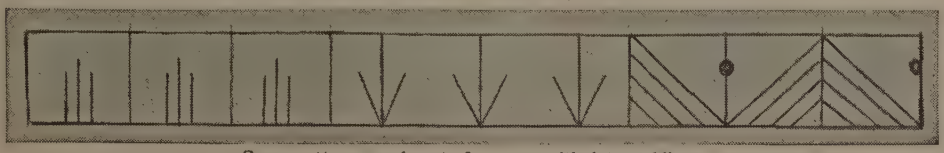


Four different ways of arranging leaves to make borders

There are several ways of arranging the lines to make a pattern shown in the pictures on this page ; but we can think of many others for ourselves, and then make some more, using dots as well as lines.

A row of little ivy leaves will make a very pretty pattern, but the ivy leaves

must all be exactly alike, drawn in a much stiffer way than when we are drawing straight from the leaf; and, as making small drawings hurts the eyes, and is not the best way to learn, we will first rule our two lines wider apart to make the divisions two inches wide instead of only one inch. If we rule our lower line two inches below the top line, our spaces will be square—each side two inches long.



Some patterns made out of squares with dots and lines

We will draw lines from each corner to find the centre of each square, and then draw a shape like the second drawing on the last page in each square first, with the chisel-pointed pencil, held in the way we have already learnt. Afterwards we can look at the ivy leaf again, and draw the shape more carefully, making each one exactly like the other, and leaving out the veins altogether. We can use other leaves if we like—the laurel or lilac or chestnut, or any simple leaf, and then, when we have one nicely drawn, and clean enough, we can colour it.

Patterns made with lines and dots look best coloured with two colours—red and dark green, or black and yellow. Patterns made with leaves or flowers should be painted in two or three colours—the background behind the design all the same colour, and the pattern in the other two. It is a good plan to look at the colouring of some plant first, and then try to match the colours for your drawing—such as the blue and green of the hyacinth flower and its leaves. When three colours are chosen, two of them can be bright colours, and the other should be a soft colour, such as grey or brown. Soon we shall learn more about colours, and which of the colours look best together.

After we have tried the borders, we can draw squares, as we learned to do before, and put patterns in these, choosing very easy shapes at first, and making them start from the centre and go outwards to the corners or sides, or from the outer corners and the middle of the sides towards the centre. We must be careful not to crowd the space, and always to think of the *square*, so that our pattern is only suitable for the square shape, and not for any other.

There is another way we can try with our patterns made of little lines and dots. We can get one of those unglazed pots which are sold at dairies for holding cream. We can buy a small buff or terra-cotta coloured one for a penny. If we get some thick black paint and draw patterns on this with our brush, we can make quite a pretty vase.

The lines must be painted very carefully first all round. The best way to do this, when we begin, is to get a strip of paper, put it against the side of the pot, mark the top and bottom with a dot, and then make the width we want our pattern to be.

Patterns made with lines and dots on an unglazed terra-cotta vase

By moving this paper strip round the vase, we can make marks all round where the lines are to come, and then we can join them afterwards. We can wash off mistakes and try again, and we can try a great many different patterns.

The pattern shown in the picture on this page represents flowers and stalks. It is quite simple to do, and after a little practice the vase should be a great success.

Paint the dots and the circles black, and the lines representing stalks either black or dark green.

LITTLE PICTURE-STORIES IN FRENCH

First line: French. Second line: English words. Third line: As we say it in English.

Nos cousins demeurent à Paris. Nous allons les visiter avec maman.
Our cousins live at Paris. We go them to visit with mamma.
Our cousins live in Paris. We are going with mamma to visit them.

Nous désirons encore les voir. Le commissionaire appelle une voiture.
We desire again them to see. The commissionaire calls a cab.
We want to see them again. The commissionaire calls a cab.

Jeannette dit : " Nos cousins, où demeurent-ils ? " " Près d'ici," répond maman.
Jenny says : " Our cousins, where live they ? " " Near of here," replies mamma.
Jenny says : " Where do our cousins live ? " " Close by," replies mamma.

Nous sommes bientôt arrivés. Nos cousins et notre tante sont très heureux de nous voir.
We are soon arrived. Our cousins and our aunt are very happy of us to see.
We are soon there. Our cousins and our aunt are very pleased to see us.

Nos cousins nous montrent tous leurs joujoux. Ils ont un grand chien.
Our cousins us show all their toys. They have a great dog.
Our cousins show us all their toys. They have a big dog.

Bébé croit que c'est notre chien nommé Prince. Elle crie : " Mon toutou ! "
Baby believes that this is our dog named Prince. She cries : " My bow-wow ! "
Baby thinks it is our dog Prince. She cries : " My bow-wow ! "

Jeannette dit : " Comment l'appellez-vous ? " Ils disent : " Son nom est Beau."
Jenny says : " How him call you ? " They say : " His name is Beautiful."
Jenny says : " What do you call him ? " They say : " His name is Beau."

Jeannette tend son mouchoir. Bruno saute en l'air et il renverse la table à thé.
Jenny tenders her handkerchief. Bruno jumps in the air and he upsets the table of tea.
Jenny holds out her handkerchief. Bruno jumps up and upsets the tea-table.

Le lait est répandu sur la robe de maman. Maman dit : " Cela n'est rien."
The milk is spilt upon the robe of mamma. Mamma says : " That not is nothing."
The milk is spilt on mamma's dress. Mamma says : " It is no matter."

Notre tante crie : " Quel dommage ! Je suis fâchée ! " Nous sonnons la clôche.
Our aunt cries : " What damage ! I am sorry ! " We sound the bell.
Our aunt cries : " What a pity ! I am so sorry ! " We ring the bell.

La bonne entre pour enlever les tasses cassées. Nous sommes réjouis de notre visite.
The maid enters for to take away the cups broken. We are enjoyed of our visit.
The maid comes in to take away the broken cups. We have enjoyed our visit.

The next SCHOOL LESSONS begin on page 2409

THE HISTORY OF THE UNITED STATES

WHEN we speak of the United States we mean, of course, the middle section of North America. Yet there is much more territory under the flag than when your parents studied geography. During the past twenty years our country has become one of the world powers with possessions in almost every sea. Some are in the frozen North, while in others it is always summer. Some are inhabited by Eskimos dressed in furs and skins, and Indians, while in others there are brown Malays and dwarf Negritos who wear almost no clothes. Some of our new cousins are peaceful folk, while others are fierce savages, who take pleasure in nothing but fighting. Some of these lands we have gained by purchase, some by war, and some by request of the inhabitants, and others because no one else seemed to want them.

FOREIGN POSSESSIONS OF THE UNITED STATES

CONTINUED FROM 2024

You have learned how the people of the thirteen old states on the Atlantic climbed the mountains, floated down the rivers beyond, and then crossed the Mississippi River, the "Great Father of the Waters." Without halting, the wagon trains made their toilsome way over the plains, reached the summit of the Rocky Mountains, and, at last, came to the Pacific. By purchase, by exploration and by conquest, we gained the territory which we now know as the United States.

SOME OF OUR POSSESSIONS IN MANY SEAS

For a considerable time this was all, but if you now look in the great atlas in the schoolroom or on your father's desk, you will find that our country holds much territory separated from the states of the Union. In the list you may find the following: Alaska, Aleutian Islands, Baker Island, Canal Zone, Guam, Hawaiian Islands, Howland Island, Marcus Island, Midway, Wake and Johnstone Islands, Philippine Islands, Porto Rico, and Tutuila.

Some of these names, I am sure, you have never heard before. Perhaps you remember when others became possessions of our country, or at least you can remember when some friend or relative came home from the Philippines, or when the soldiers came home from Cuba, or when some friend went to Panama to help dig the great Canal. Then too you remember that we sent another army to Cuba some time ago which came back a little while later. Yet Cuba is not on our list. We shall see what we have to do with that country soon.

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ALASKA AND THE ISLANDS AROUND IT

The first of our possessions in size and importance is Alaska and the Aleutian Islands, which are really a part of it. The area is about 590,000 square miles, or between one-fifth and one-sixth the size of the United States, and about the size of the German Empire, France and Spain taken together. It cost when we bought it from Russia about two cents an acre.

It is a wonderful country of high mountains, great plains and broad rivers. From some of these mountains, great ice rivers, or glaciers, about which you read on page 2515, slowly slide down to the sea. There huge sections break off and become icebergs. When your editor studied geography in school, the book said that Mt. St. Elias (over 18,000 feet) was the highest mountain in North

America. Your geographies tell you that Mt. McKinley (over 20,000 feet), which had not been measured or even discovered until thirty years ago, is the highest.

Along the coast are more than eleven hundred islands, known as the Alexander Archipelago. Some of these are high mountains with great forests on their sides. Stretching to the west more than 1,000 miles beyond the mainland and reaching almost to Asia are the Aleutian Islands.

The great territory has been known to white men less than two hundred years. In 1728, Vitus Bering, in command of a Russian ship, discovered the mainland and the narrow band of water between it and Russia, which now bears his name. He again explored the coast in 1741, and about twenty-five years later, Captain Cook, the English sailor of whom you have read so much in our book, also sailed along the coast.

THE RUSSIAN FUR COMPANY MANAGES THE COUNTRY

Not until 1784 was a small trading settlement made. Later, a few other little settlements were made to trade with the Indians for furs, and Sitka became a busy town. There were brass and iron foundries and machine shops, and a shipyard where steamships were built.

The fur company was not always well managed, much money was wasted, and many of the white men moved away. When the United States finally got possession only a few hundred white men were living in the whole country, and the story of the past had been almost forgotten. A few Eskimos lived in the far North, and some Indian tribes were scattered over the South, but much of the territory was not inhabited at all.

It had never paid Russia, and so that country sold it to the United States in 1867, for $7,200,000. A few people in California and Oregon thought that the furs and the fisheries would be valuable to the country, but nearly every one else laughed at the purchase of polar bears and icebergs.

So little attention was paid to the country that the United States did not even provide any sort of government until seventeen years later, though it was supposed to be under United States laws. During the year seal and whale hunters made camps on the islands stretching out toward Asia, and a few fishing vessels touched the coast. Trappers and hunters wandered through a part of the country, but there were hundreds of square miles never seen by white men.

GOLD IS DISCOVERED AND A RUSH BEGINS

Though stories of finding gold often came down the coast to Oregon and California, they did not cause much excitement until 1896. Then it was told that rich finds had been made on the Yukon River in the region known as the Klondike in Canada, and thousands of people hurried there. Gold was also found on the American side, and in 1898 still richer deposits were found at Nome on the western coast.

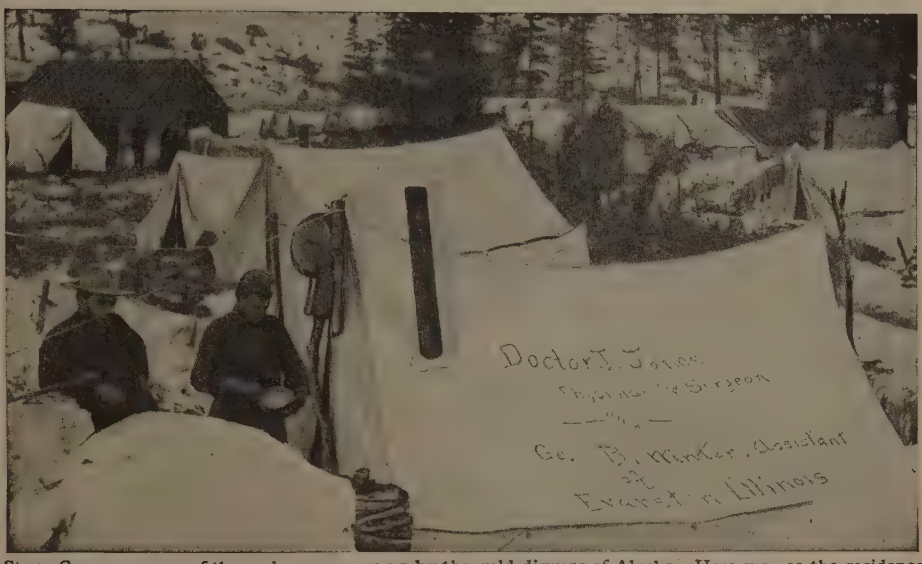
At Nome the richest finds were on the beach, where the precious metal had been washed from the hills. Here men toiled hour after hour, digging out the frozen sands, from which they washed the shining grains. One crippled old miner, who had not been able to follow the rush far into the land, washed out $3,000 in twenty days.

When the news of all these discoveries was carried over the world, another rush like that to California fifty years before occurred. Every old steamboat on the Pacific coast was pressed into service, and carried struggling crowds toward the golden North. Once landed, on foot, or with sledges drawn by dogs, they strove to make their way over the hills and across the streams toward the goldfields. There were no roads, only paths called trails, where the snow had been beaten down by the feet of men and the runners of sledges.

THE DANGERS AND HARDSHIPS OF THE JOURNEY

Many died from cold and hunger on the way. Wolves took others who strayed from the trail. Only the strong could endure the hardships of the journey and the privations of the life. But as others came, the trails

ROUGHING IT IN ALASKA



Sheep Camp was one of the early camps set up by the gold diggers of Alaska. Here we see the residence and office of the principal doctor in the place. Though trees grow near, no one had time to build regular houses, and no one was willing to work for wages when he might be digging for gold.

If you will get the map of Alaska you will find the Allenkakat River just a little north of the centre. For several years, this boy, Will Campbell, was the only white boy in the whole region. He has harnessed his puppies just as if they were full-grown dogs, and is teaching them to draw the sled, which will be their regular business when they are older.

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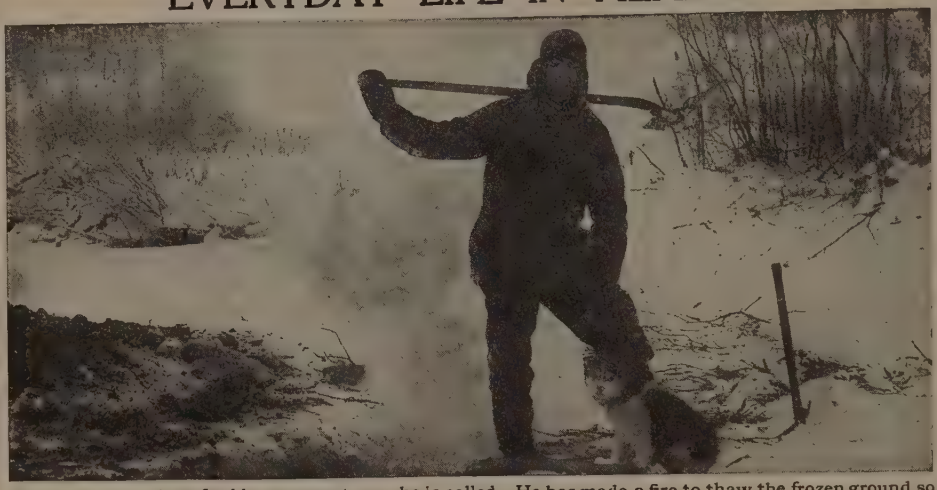
EVERYDAY LIFE IN ALASKA



Here we see a seeker of gold, or prospector, as he is called. He has made a fire to thaw the frozen ground so that he can dig. Much gold has been washed from the hills into the low places.

The Indians of Alaska are less savage than the former inhabitants of the United States. Many of them are willing to work, and have adopted many of the white men's ways. They have also adopted his bad habits, and many are suffering.

The gradual disappearance of whale, walrus, and seal has caused much suffering among the Eskimos. Our government is trying to introduce the Siberian reindeer to furnish food, clothing and, a means of travel.

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were made wider, and some roads in the southern part were made passable for horses. Railroads were pushed into the interior. Steamboats now run on the Yukon and some of the other rivers. Further exploration has shown large deposits of coal, iron, copper and petroleum, which will soon be opened up.

Not all of Alaska is bitterly cold. The warm winds from the Pacific bring moisture to the coast, and the high mountains shut off the cold Arctic winds. Rain falls on more than two hundred days in the year. Great forests are seen, and the meadows furnish excellent hay. In much of the country our ordinary vegetables can be raised during the short hot summer, and some grain also grows. But in the interior the temperature is often 50° below zero during the winter, and a few feet down, the ground is always frozen. We shall tell you more of this wonderful country in another place.

ANOTHER POSSESSION WHERE IT IS ALWAYS SUMMER

Far to the South of cold Alaska are some Pacific islands where it is always summer. These are the Hawaiian Islands, which were annexed to the United States at the request of the inhabitants in July, 1898. There are seven of these upon which people live, one which was once inhabited though now deserted, and twelve smaller islands. The natives visit these to gather the eggs of the sea birds.

All the islands taken together are not large, as they contain only about 6,500 square miles. That is, all together they are larger than Connecticut, but smaller than New Jersey. The largest is Hawaii, but Oahu, which contains Honolulu, the chief city, has more people.

These islands were made, the wise men tell us, by volcanoes which pushed up from the sea bottom and poured out their lava. This decaying lava makes a rich soil, and since there is much rain, everything grows like magic. Some of the volcanoes are not dead. Kilauea on Hawaii is the largest active volcano in the world. The crater, that is, the bowl-shaped top of the mountain, is about nine miles around, and in the centre is a great lake of melted lava, which rises and falls like water in a reservoir. At night the sight of this red-hot, quivering mass is one of the most wonderful sights to be seen anywhere.

EARLY EXPLORERS OF THE ISLANDS

These islands had been discovered by Spanish ships before the year 1550, but little notice was taken of them until Captain Cook, of whom you read on page 1458, visited them in 1778. He called them the Sandwich Islands, and on his second visit quarrelled with the natives, who killed him. Another brave British explorer, George Vancouver, of whom you have read, left some cattle on the islands a few years later, and taught the people how to build boats.

American missionaries went to the islands in 1820, and soon the leading natives, who belong to the brown race, called themselves Christians. Many of the people still followed their heathen gods, and it is said that some do to the present day. The royal family died out in 1872, and Kalakaua was elected King. He was a very bad ruler and tried to restore the idols and to take away the liberties from the people.

THE PEOPLE DRIVE THEIR QUEEN FROM HER THRONE

On his death in 1891, his sister Liliuokalani tried to follow in his footsteps. By this time there were many white people on the islands. Some of them were the children and grandchildren of the missionaries, and others had gone there to trade. They put the Queen off the throne in 1893, declared themselves under the protection of the United States, and asked to be joined to that country. This was not allowed at the time, but they refused to allow the Queen to become their ruler again, and governed themselves as a republic. At last, in 1898, they were joined to the United States and are now governed like the territories once were and have a delegate in Congress who may speak but who has no vote.

THE WHITE MAN'S WAYS PROVE FATAL

Since they were annexed, wealth has increased. The principal crop is sugar

cane, though pineapples and bananas are grown for export. The greatest trouble is the scarcity of labour. The white man's whiskey, as well as the white man's Bible, came in with the trading ships, and many of the natives became drunkards. Then too the white man's diseases have caused the death of many. It always happens among uncivilised people that a new disease does more harm than it does among the people who are accustomed to it. The natives are now dying out and only 30,000 of them are left. Once there were five or six times as many.

Many whites of Portuguese descent were brought in to work on the sugar plantations, but now they do work which is better paid. Then Chinese were brought in and many of them have become prosperous farmers. They have in many cases married the native women and their children are often good citizens. The Japanese came next, but most of them stayed only a few years before returning to Japan, but their places were taken by others.

The Japanese have made much trouble for the owners of the plantations and for the officers of the law. A few years ago, it is said, they formed a plot to capture the islands and turn them over to Japan. That country would find the islands very useful as a stopping place for her navy.

THE LEPER ISLAND OF MOLOKAI

Perhaps you have heard of the leper island of Molokai. Leprosy is a terrible disease which slowly eats away the skin and flesh. It is said that it was unknown among the islands until brought from China about sixty years ago. Since 1865 all lepers have been sent to the island of Molokai, where they are well treated, have good houses and abundant food. A well person may go here with a loved one, but may never return, and in many cases is attacked by the disease.

It was here that Father Damien, about whom you read on page 65, lived and died. Now there are three churches on the island and a home for boys and another for girls. These homes are supported and managed by a Catholic Sisterhood of American women. Every effort is made by the government and the churches to make life pleasant, but after all it is a living death.

Life on the other islands is pleasant in many ways. The climate is delightful, game and fish are plentiful, fruits and vegetables of many kinds are grown. One who has once lived on these islands always desires to return.

The natives are fond of games and sports of many kinds. Even the babies are good swimmers, and a favourite amusement is riding on a narrow board over the surf, as it beats upon the shores. Nature furnishes food, little clothing is needed, and therefore most of the natives refuse to do much work.

ANOTHER GROUP OF ISLANDS AND THE SAVAGE INHABITANTS

Further to the south and further west is another group of islands over which our flag floats. These are the Philippines, named for Philip II of Spain, and first seen by Magellan, as you were told on page 60. There are many hundreds of them, but two are much larger than all the others taken together. Nine more have more than 1,000 square miles each, while some are only points of rock. All together they have about the same area as Virginia, North Carolina and South Carolina. The population is now about 8,000,000 of which hardly 20,000 are white.

There are many high mountains with about fifty volcanoes. Twenty of these are alive. Earthquakes are frequent, and in many places the surface of the land is either rising or falling. The land is fertile and great forests cover a large part. There are two seasons, the wet and the dry, and during the first some rain falls almost every day.

NATIVES BLACK AND BROWN; PEACEABLE AND SAVAGE

The first inhabitants were black, the wise men tell us, and from them the Negritos are descended. The Malays then invaded the islands, and after a time a second invasion drove the first into the hills. From this first invasion come the Igorrotes and other pagan tribes. These are the famous head-hunters. Their conquerors became Christians, and the seven great tribes of them are called Filipinos. Then a

THE BEAUTIFUL HAWAIIAN ISLANDS

The Hawaiians believe that they have the most beautiful country in the world. On the left is a rice field, and on the right is a corner of a banana plantation. The banana is one of the chief articles of food of the natives, and produces very heavy crops.

The grass hut on the left is the kind of house in which thousands live. In striking contrast is the old palace of the kings in Honolulu, now used as the government house by the governor and other officers.

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third Malay invasion arrived, but this time it was the Mohammedan Malays, and from them are descended the fierce Moros. So one can say that the native inhabitants are the Negritos, the pagan Malays, the Mohammedan Malays and the civilised Malays.

The Moros would have conquered the islands, if the Spanish had not come in 1565, to take possession. Not all the islands were conquered, but the Spanish tried to make all the people Christians. The Chinese and the Dutch tried to capture the islands but failed. England took them during the French and Indian War about which you read on page 882, but gave them back at the end of the war.

THE BATTLE OF MANILA BAY WON BY COMMODORE DEWEY

You may read in another place of what we call the Spanish War. When the United States declared war against Spain, Commodore Dewey with an American fleet sailed into Manila Bay, and destroyed the Spanish fleet on May 1, 1898. A few weeks afterward the city itself surrendered. When peace was finally made the United States kept the islands, but in return paid Spain $20,000,000.

Just at this time the Filipinos under Aguinaldo had been fighting for their freedom. When they found that the United States did not intend to grant their independence at once, they revolted against this country, and were not conquered for several years. Even yet some of the wild tribes are ready to fight at a moment's notice.

The United States has announced that when the people are prepared for it, independence will be granted, but many of the Filipinos think they are ready now. The governor is appointed by the President of the United States and is assisted by Commissioners appointed by the same officer. The people elect an assembly which has the right to pass laws on many subjects, but the Commission and the governor must also agree. William H. Taft, later our President, was the first governor, and did much to start the machinery of government to running smoothly.

WHAT THE ISLANDS PRODUCE, AND WHY THEY DO NOT PRODUCE MORE

The resources of the islands are very great. Gold, iron, copper, sulphur, petroleum and marble are found in large quantities. The timber is very valuable and includes many kinds so hard that they cannot be cut by ordinary saws. Some of these take a high polish. There are thousands of cocoanut palms, as you see in our pictures.

The most important article sent out from the islands is hemp, about which you are told in another place. Next comes sugar from the sugar cane. Good coffee is grown and the cocoa tree is also found. Philippine tobacco finds many admirers. Our Indian corn grows well, rice is a good crop and sweet potatoes form a large part of the food of the people. The soil is rich, and if properly cultivated would produce even larger crops. White men have trouble in working in the climate, however, and the natives work as little as possible.

Since a very little labour will produce enough for their simple wants, they take many holidays. They do not like to use new tools. If you look at the plough in one of our pictures you will see that it is only a forked stick. The greater number of the Filipinos have little desire to improve their condition.

SPAIN'S FAILURE IN THE WEST INDIES

Now we turn to the Atlantic Ocean, where are other possessions of our country, also gained in the Spanish War. But let us see first what this war was. Spain at the end of the nineteenth century still controlled Cuba and Porto Rico, but the Cubans were very restless. Many times they revolted, and the revolts were put down, but only for a little while.

In 1895 a fresh rebellion began. Spain had learned nothing by experience and attempted to crush this revolt by strong measures. General Weyler, who had been Governor-General of the Philippines, was put in charge, and began to burn the houses and crops, and to drive the people into the towns where they were kept prisoners. President Cleveland objected, but was told that he must not interfere. The anger of the

DOMESTIC SCENES ON ISLAND OF LUZON

The girl is winding hemp on a reel in the same way that it has been done for 500 years. The second group is ironing clothes. The garment is wrapped around the roller, and by see-sawing is made smooth.

This scene in Manila shows one of the public washing places in the Pasig River. The river is not very clean, and naturally, the clothes are not either. Notice the United States soldier guarding government supplies in the background.

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WORK AND PLAY IN THE PHILIPPINES

Thousands of the people of Manila live in houseboats moored in the Pasig River. Cockfighting is the chief amusement of the people, and on holidays hundreds tuck their pet cocks under their arms, and hunt for a chance to fight. Baseball has been introduced and is growing popular.

The chief food of the Filipino is rice, and here we see how it is planted. Young stalks, a few inches high, which are grown from seed, are planted in the mud under water. These are Igorrote boys.

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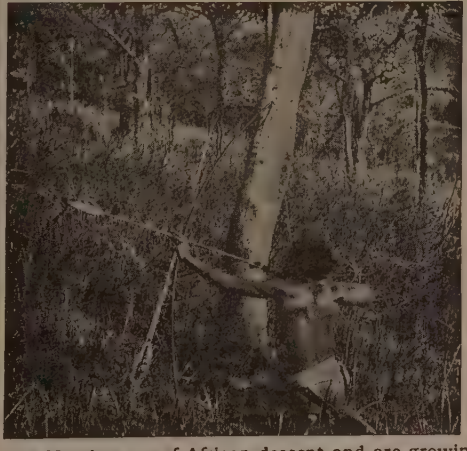
SCENES IN THE PHILIPPINES

The cocoanut palm furnishes food, drink, oil, timber, and rope. A tree produces about 100 nuts a year. Here you see a grove with the nuts piled up ready for market, and a raft of them on the way to Manila.

The methods of farming have not changed for centuries. The buffalo or carabao is the chief beast of burden. Mayon is one of the most beautiful volcanoes in the world. The town at the foot is Legaspi, Island of Luzon.



The Negritos are of African descent and are growing fewer. They are fearless hunters. The picture on the right show a village of the Igorrotes, who are fierce and bloodthirsty. The heads of their enemies are valued as trophies. Under American rule the practice has almost died out.

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American people grew, and Spain removed General Weyler, but no other change was seen.

THE MAINE IS DESTROYED IN HAVANA HARBOUR AND WAR FOLLOWS

Finally when one of our battleships, the Maine, was in Havana Harbour, she was blown up, February 15, 1898, and more than two hundred and fifty lives were lost. It was believed that a mine had been exploded underneath her, and the people demanded that Spain be punished. President McKinley tried to avoid war, but could not succeed, and April 19, Congress declared that Cuba ought to be independent.

The first victory was the capture of Manila by Commodore Dewey. Troops were landed on Cuban soil on June 22, and the next day, and again on July 1, battles were fought near Santiago. A Spanish fleet under Admiral Cervera, which had come from Spain and entered the harbour of Santiago, suddenly came out, July 4, with the hope of escaping the blockading fleet. This fleet, under Commodore W. T. Sampson, with Commodore Schley second in command, followed and a running fight took place. One by one the Spanish ships were either sunk, or set on fire and run on the shore. After the fleet was destroyed Santiago soon surrendered with 23,000 men.

THE ISLAND OF PORTO RICO CAPTURED AND HELD

General Miles was sent to Porto Rico, another Spanish island east of Cuba, with a force of 17,000 men. This force had little fighting to do, and soon the whole island was in American hands.

Spain agreed to give up all claim to the control of Cuba, to give over Porto Rico and some other little islands near it, the Philippine Islands, and the Island of Guam, which is in the Pacific Ocean between Hawaii and the Philippines. The United States gave $20,000,000, though not exactly as payment for the islands.

No European nation believed that the United States would keep its promise not to keep Cuba. For a time, soldiers were kept there and an army officer acted as governor. Schools were established, roads and telegraphs were built and war was declared against yellow fever. It was discovered that the disease was carried from a sick person to a well one, only by a kind of mosquito. So the seaports were made clean, and all places where mosquitos could breed were looked after.

WHAT CUBA LACKS OF BEING ENTIRELY INDEPENDENT

Then the Cubans were offered control of their government if they would do the following four things: (1) Cuba must make no treaties with foreign powers which would hurt the United States; (2) the country must not go too deeply in debt; (3) it must give to the United States places on its shores to keep coal for the warships; (4) the ports must be kept clean so that yellow fever cannot get started. You see the island is so close to the United States that a ship may easily carry the disease to our southern ports.

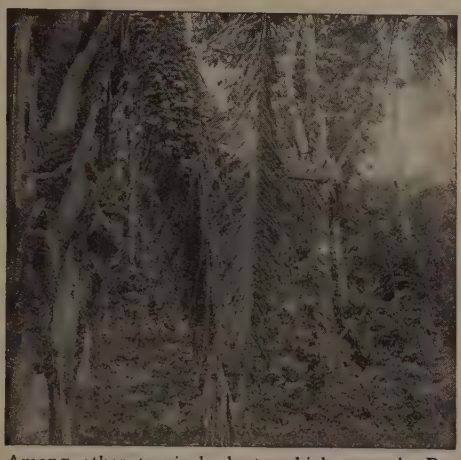
The Cubans agreed, formed a constitution, and elected their officers. For a time all went smoothly, but after a time trouble began and an army was raised to drive out the President. Then the United States sent troops again, and kept order until the country became quiet again. Then another president was elected and the army was taken away. So you see that Cuba is not quite free, but is somewhat under the protection of the United States.

But what of the two islands we took from Spain? Porto Rico was visited by Columbus on his second voyage, and later Ponce de Leon, as you read on page 258, became governor. Negro slaves were brought in and the Indians gradually disappeared. For a little while the island was held by the English but afterward was returned to Spain. While Cuba was fighting for independence, Porto Rico was restless but did not declare open war.

PORTO RICO A WINTER PARADISE

The island contains over 3,600 square miles, which means that it is about three-fourths the size of Connecticut. The climate is pleasant, though hot except in the mountains, and the soil is rich. There are large forests of good timber and the coffee tree grows well.

ALONG THE PANAMA CANAL ZONE



Among other tropical plants which grow in Panama is the rubber tree, which you see here. The rainfall and the heat make vegetation of all sorts grow like magic. In a few weeks, vines and ferns grow much higher than a man's head.

This street, in the city of Panama, with its quaint overhanging balconies, is entirely unlike one of our streets. The ruins of the old church show one of the flattest arches in existence.

This is part of the Bay of Panama, the Pacific terminus of the great canal. The canal, which was opened to navigation in August, 1914, provides a short cut between the Atlantic and Pacific ports of the United States. It makes an actual difference of 7,873 miles between New York and San Francisco, and 5,800 miles between New York and our Pacific possessions. Copyright by Keystone View Co.

Sugar cane and tobacco are the largest crops, next to coffee, but cotton is grown also. Oranges, lemons, limes, grapefruit and pineapples grow wild.

About three-fifths of the people are white and the others have more or less negro blood. Except in the towns there are few educated people, for when the United States took the island only sixteen or seventeen persons in a hundred could read and write. Our government has built many new schools and soon we shall see great changes.

There is little to be said about Guam. It was taken because we needed a coaling station for warships. It is very much like the Philippines in soil, climate and population. Very few whites live on the island.

THE ISLANDS ROBERT LOUIS STEVENSON LOVED

Since we have been naming our chief possessions in the order in which we gained them, we now go back to the Pacific, where there are so many wonderful islands. One particularly beautiful group is the Samoan or Navigator Islands. They were discovered in 1768 by a French sailor, De Bougainville, but France never made any settlements. In 1839 Charles Wilkes, an American naval officer, surveyed the islands and made a sort of treaty with the chiefs.

Great Britain and the German Empire next began to be interested in the islands, and in 1889, these nations and the United States made an agreement to protect the native king. This king died in 1898, and there was a dispute about his successor. The three nations also could not agree about several matters, and so in 1899, the islands were divided between the United States and the German Empire. The United States took Tutuila and the Manua group, all together about 225 square miles. These islands are important only because of the harbour of Pago-Pago on Tutuila. This is one of the best harbours in the Pacific Ocean, and would be useful in case of war.

LIFE ON THE SAMOAN ISLANDS

The people are brown-skinned, tall and strong. Many of the girls are very beautiful. The climate is mild. Everything grows almost without labour, so that there is time for dancing, singing, feasting, and church-going; for nearly all of them are Christians. Robert Louis Stevenson spent his last years in the Samoan Islands, which he grew to love with all his great heart. The islanders sell cotton, sugar, coffee and cocoanuts, but as there are hardly 5,000 people on Tutuila, you can see that the trade cannot amount to very much. A naval officer is the governor.

While the United States was getting possession of so much foreign territory in 1898–99, it also picked up some small islands. Strange to say there were a number of small islands in the Pacific, which had never been claimed by any nation.

AN ISLAND ON WHICH NOTHING GROWS

Midway Island, for example, is coral sand. Nothing grows upon it, and the only residents are cable operators and a squad of marines. The servants are Chinese or Japanese. Three or four times a year a boat stops to leave supplies and orders, and brings books and newspapers. When it goes the few inhabitants settle down for another three months of quiet.

Now what is the Canal Zone? We shall not tell you much about the Panama Canal now, but shall leave that for another volume. It is enough to say that the Republic of Panama in 1903 leased to the United States a strip of land five miles wide on each side of the Canal. Over this the United States has entire control for a hundred years and then may continue the lease. The City of Colon on the Atlantic side, and of Panama on the Pacific side do not belong to the Zone. The United States has been given the right to see that the cities are kept clean, however.

LIFE ON THE PANAMA CANAL ZONE

On the Zone have grown up several villages and towns, where the men at work on the Canal live. The inhabitants of the Zone are principally white men from the United States or negroes from the West Indies, though there are a few Spanish and Italian labourers. The natives of the country will not work.

CONTINUED ON PAGE 2417

PANAMA AND THE COUNTRY AROUND

Sugar cane grows in Panama, and here we see a rude sugar-making plant. The cane is crushed between rollers, and the juice is boiled under the shed. The house on the right is the home of a native family.

Panama City is beautifully located, and since the American engineers cleaned up the streets and built sewers, it is a pleasant place to live. Much dirt and filth was removed and many old houses were torn down to improve conditions.

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THE SUBJECTS OF POETRY

HAVING now got a general idea of the uses of poetry and of how we can best proceed with the very pleasant task of storing our minds with good poetry, we have to turn next to a new series of studies, in noticing the different purposes of poetry, the subjects with which it deals. There are a great many of these, but as we shall only take up one at a time they will be easy to learn, and when we have gone through this series we shall find ourselves prepared to understand more clearly the poetry of each great poet, as, later on, we shall come to learn that also.

THE POETRY OF NATURE

CONTINUED FROM 2157

EVERY country has a different kind of poetry. That is quite natural. Just as the peoples differ, so will their thoughts and feelings differ. We cannot attempt here to show those differences between the poetry of one country and another; it is enough to say that the poetry of France, of Italy, or of Scandinavia is quite another thing from that of America. English poetry, too, is somewhat different from Irish or Scottish, though many Scottish and Irish poets have written poems which are purely English in spirit and form.

The first thing we notice in reading English poetry is what is called the "feeling for Nature." This simply means that the writers all seem to be in love with the natural objects and the rural life of their own land. They rejoice to sing of spring mornings, of summer days and sunsets, of lakes and rivers, mountains and glens, of larks and nightingales, the sea that breaks along her many coasts, and so on.

This love of Nature does not appear so much in the poetry of any other country as in that of England.

Even the great dramatic poets, like Shakespeare and Christopher Marlowe, had this love for the natural delights of the country. But long before Shakespeare and Marlowe, long before Chaucer even — and he loved the natural scenes of Nature, and sang of them sweetly — this "note," as it is called, had been given to all her poetry.

The very oldest English song was about the coming of summer. It was written a thousand years ago, and its words are so simple, that, although our language has greatly changed since then, it is not very difficult to read it even now. We shall print it in modern English, however, as it was changed by a poet who lived two hundred years ago:

Summer is a-coming in,
Loud sing, cuckoo;
Groweth seed, and bloweth mead,
And springeth the wood now,
Sing, cuckoo, cuckoo.

Ewe bleateth after lamb,
Loweth calf after cow,
Bullock starteth, buck departeth,
Merry sing, cuckoo,
Cuckoo, cuckoo.
Well singeth the cuckoo,
Nor cease to sing now;
Sing cuckoo, now,
Sing cuckoo.

And in all these years all the poets have been singing out of the fulness of their hearts of the changing seasons and the green and golden beauties of the land, so that a vast amount of the "poetry of Nature" is to be found in the works of our poets.

Tennyson gives us many pictures of Nature that are perfectly beautiful, as, for instance, "The Brook" (see page 95); while Wordsworth in such a poem as "The Daffodils" (see page 96), and Bryant, Whitman, Burns, Longfellow, and many more, are so filled with this great love of Nature that we might almost think in reading them we were listening to the very voice of Nature herself.

That is really what great poetry ought to be — the voice of Nature. And American poetry is great largely because so much of it has sprung from our love of her beauties.

JUNE

This selection is taken from "The Vision of Sir Launfal," by James Russell Lowell, one of our foremost American poets. It contains the most beautiful description of June that ever was written in any language.

And what is so rare as a day in June?
Then, if ever, come perfect days;
Then Heaven tries earth if it be in tune,
And over it softly her warm ear lays;
Whether we look or whether we listen,
We hear life murmur or see it glisten;

. . . . . .

The little bird sits at his door in the sun,
Atilt like a blossom among the leaves,
And lets his illumined being o'errun
With the deluge of summer it receives;
His mate feels the eggs beneath her wings,
And the heart in her dumb breast flutters and sings;
He sings to the wide world and she to her nest,—
In the nice ear of Nature which song is best?

THE BRIDGE

Long a favourite recitation, this poem by Longfellow is certainly one of his finest shorter pieces. The subject is picturesque and suggestive of thought. The poem is understood to have been inspired by just such a scene in Longfellow's native town of Portland, Maine.

I stood on the bridge at midnight,
As the clocks were striking the hour,
And the moon rose o'er the city,
Behind the dark church-tower.

I saw her bright reflection
In the waters under me,
Like a golden goblet falling
And sinking into the sea.

And far in the hazy distance
Of that lovely night in June,
The blaze of the flaming furnace
Gleamed redder than the moon.

Among the long, black rafters
The waving shadows lay,
And the current that came from the ocean
Seemed to lift and bear them away;

As, sweeping and eddying through them,
Rose the belated tide,
And, streaming into the moonlight,
The seaweed floated wide.

And, like those waters rushing
Among the wooden piers,
A flood of thoughts came o'er me
That filled my eyes with tears.

How often, oh, how often,
In the days that had gone by,
I had stood on that bridge at midnight,
And gazed on that wave and sky.

How often, oh, how often,
I had wished that the ebbing tide
Would bear me away on its bosom
O'er the ocean wild and wide!

For my heart was hot, and restless,
And my life was full of care,
And the burden laid upon me
Seemed greater than I could bear.

But now it has fallen from me,
It is buried in the sea;
And only the sorrow of others
Throws its shadow over me.

Yet whenever I cross the river,
On its bridge with wooden piers,
Like the odour of brine from the ocean
Comes the thought of other years.

And I think how many thousands
Of care-encumbered men,
Each bearing his burden of sorrow,
Have crossed the bridge since then.

. . . . . .

And for ever and for ever,
As long as the river flows,
As long as the heart has passions,
As long as life has woes;

The moon and its broken reflection
And its shadows shall appear,
As a symbol of love in heaven,
And its wavering image here.

AUTUMN

These lines are by the English poet, Percy Bysshe Shelley, and illustrate a view of Nature which, though it lacks the simplicity we find in the Nature poems of Robert Burns, gives us beauty of another kind, complex and more or less artificial, yet wonderfully rhythmical and melodious.

The warm sun is failing, the bleak wind
is wailing,
The bare boughs are sighing, the pale flowers are dying;
And the Year
On the earth, her deathbed, in a shroud of leaves dead
Is lying.
Come, Months, come away,
From November to May,
In your saddest array—
Follow the bier
Of the dead cold Year,
And like dim shadows watch by her sepulchre.

The chill rain is falling, the nipt worm is crawling,
The rivers are swelling, the thunder is knelling
For the Year;
The blithe swallows are flown, and the lizards each gone
To his dwelling.
Come, Months, come away,
Put on white, black, and gray;
Let your light sisters play;
Ye, follow the bier
Of the dead cold Year,
And make her grave green with tear on tear.

O, BOYS, CARRY ME 'LONG

These old darkey melodies are very dear to the hearts of most of us. The following was written by Stephen Collins Foster, the author of "The Old Kentucky Home."

OH! carry me 'long;
Der's no more trouble for me;
I's guine to roam in a happy home,
Where all de niggas am free.
I've worked long in de fields;
I've handled many a hoe;
I'll turn my eye, before I die,
And see de sugar-cane grow.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

All ober de land,
I've wandered many a day;
To blow de horn, and mind de corn,
And keep de possum away.
No use for me now,
So, darkies, bury me low;
My horn is dry and I must lie,
Wha de possum nebber can go.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

Farewell to de boys,
Wid hearts so happy and light,
Dey sing a song, de whole day long,
And dance de juba at night.
Farewell to de fields
Ob cotton, 'bacco, and all;
I's guine to hoe, in a bressed row
Wha de corn grows mellow and tall.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

Farewell to de hills,
De meadows covered wid green,
Old brindle Boss, and de old gray hoss,
All beaten, broken and lean.
Farewell to de dog,
Dat always followed me round;
Old Sancho 'll wail and droop his tail,
When I am under de ground.
Oh! boys, carry me 'long,
Carry me till I die;
Carry me down to de buryin' groun',
Massa, don't you cry.

THE SILENT VOICES

WHEN the dumb Hour, clothed in black,
Brings the Dreams about my bed,
Call me not so often back,
Silent Voices of the dead,
Toward the lowland ways behind me,
And the sunlight that is gone!
Call me rather, silent Voices,
Forward to the starry track
Glimmering up the heights beyond me
On, and always on!

— LORD TENNYSON.

THE OLD ARM-CHAIR

Most of us have some inanimate thing in our possession around which cluster memories that make it unspeakably dear to us. "The Old Arm-Chair" was written by Eliza Cook, an English poet.

I LOVE it, I love it; and who shall dare
To chide me for loving that old arm-chair?
I've treasured it long as a sainted prize;
I've bedew'd it with tears, and embalm'd it with sighs.
'Tis bound by a thousand bands to my heart;
Not a tie will break, not a link will start.
Would ye learn the spell? — a mother sat there;
And a sacred thing is that old arm-chair.

In childhood's hour I linger'd near
The hallow'd seat with listening ear;
And gentle words that a mother would give
To fit me to die, and teach me to live.
She told me shame would never betide,
With truth for my creed and God for my guide;
She taught me to lisp my earliest prayer,
As I knelt beside the old arm-chair.

I sat and watch'd her many a day,
When her eye grew dim, and her locks were gray:
And I almost worshipp'd her when she smiled,
And turn'd from her Bible, to bless her child.
Years roll'd on: but the last one sped —
My idol was shattered; my earth-star fled;
I learnt how much the heart can bear,
When I saw her die in that old arm-chair.

'Tis past, 'tis past, but I gaze on it now
With quivering breath and throbbing brow;
'Twas there she nursed me; 'twas there she died;
And Memory flows with lava tide.
Say it is folly, and deem me weak,
While the scalding drops start down my cheek;
But I love it, I love it; and cannot tear
My soul from a mother's old arm-chair.

*MY MENAGERIE

This little poem by Mrs. Elder is full of the quaint fancies of childhood. Who of us has not lain on the soft, warm grass and watched the pictures in the sky form and melt away as the clouds drift across the heavens?

NO need to the circus to go have I,
For a whole menagerie lives in the sky!

And when in the tall, thick grass I lie,
I see the procession go passing by.

There are lions and bears and queer little cats,
And moolies and mice and long-tailed rats.

And great big elephants trotting behind
Some very fat pigs who, I guess, have just dined.

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And sometimes a clown slyly shows his face,
As he struts along at a pompous pace.

And I laugh as I watch the caravan pass,
As I lie on my back on the soft, green grass.

It's lots nicer than sitting squeezed in a row,
And the best of it is there's no pay, you know.

All you have to do is to look at the sky,
And you'll see the procession go passing by.

THE BAREFOOT BOY

"The barefoot boy," who does not love him? John Greenleaf Whittier shows him to us in all his winsomeness in this little poem.

BLESSINGS on thee, little man,
Barefoot boy, with cheek of tan!
With thy turned-up pantaloons,
And thy merry whistled tunes;
With thy red lip, redder still
Kissed by strawberries on the hill;
With the sunshine on thy face,
Through thy torn brim's jaunty grace;
From my heart I give thee joy,—
I was once a barefoot boy!
Prince thou art,—the grown-up man
Only is republican.
Let the million-dollared ride!
Barefoot trudging at his side,
Thou hast more than he can buy
In the reach of ear and eye,—
Outward sunshine, inward joy:
Blessings on thee, barefoot boy!

Oh, for boyhood's painless play,
Sleep that wakes in laughing day,
Health that mocks the doctor's rules,
Knowledge never learned of schools,
Of the wild bee's morning chase,
Of the wild-flower's time and place,
Flight of fowl and habitude
Of the tenants of the wood;
How the tortoise bears his shell,
How the woodchuck digs his cell,
And the ground-mole sinks his well;
How the robin feeds her young,
How the oriole's nest is hung;
Where the whitest lilies blow,
Where the freshest berries grow,
Where the ground-nut trails its vine,
Where the wood-grape's clusters shine:
Of the black wasp's cunning way,
Mason of his walls of clay,
And the architectural plans
Of gray hornet artisans!
For, eschewing books and tasks,
Nature answers all he asks;
Hand in hand with her he walks;
Face to face with her he talks,
Part and parcel of her joy,—
Blessings on the barefoot boy!

Oh for boyhood's time of June,
Crowding years in one brief moon,
When all things I heard or saw,
Me, their master, waited for.
I was rich in flowers and trees,
Humming-birds and honey-bees;
For my sport the squirrel played,
Plied the snouted mole his spade;
For my taste the blackberry cone
Purpled over hedge and stone;
Laughed the brook for my delight
Through the day and through the night,
Whispering at the garden wall,
Talked with me from fall to fall;
Mine the sand-rimmed pickerel pond,
Mine the walnut slopes beyond,
Mine, on bending orchard trees,
Apples of Hesperides!
Still as my horizon grew,
Larger grew my riches too;
All the world I saw or knew
Seemed a complex Chinese toy,
Fashioned for a barefoot boy!

Oh for festal dainties spread,
Like my bowl of milk and bread;
Pewter spoon and bowl of wood,
On the door-stone, gray and rude!
O'er me, like a regal tent,
Cloudy-ribbed, the sunset bent,
Purple-curtained, fringed with gold,
Looped in many a wind-swung fold;
While for music came the play
Of the pied frogs' orchestra;
And, to light the noisy choir,
Lit the fly his lamp of fire.
I was monarch: pomp and joy
Waited on the barefoot boy!

Cheerily, then, my little man,
Live and laugh, as boyhood can!
Though the flinty slopes be hard,
Stubble-speared the new-mown sward,
Every morn shall lead thee through
Fresh baptisms of the dew;
Every evening from thy feet
Shall the cool wind kiss the heat:
All too soon these feet must hide
In the prison cells of pride,
Lose the freedom of the sod,
Like the colt's for work be shod,
Made to tread the mills of toil,
Up and down in ceaseless moil:
Happy if their track be found
Never on forbidden ground;
Happy if they sink not in
Quick and treacherous sands of sin.
Ah! that thou couldst know thy joy,
Ere it passes, barefoot boy!

A VISIT FROM ST. NICHOLAS

"A Visit from St. Nicholas" is a poem by Clement C. Moore that is very well known and much loved by most of our boys and girls.

'TWAS the night before Christmas, when all through the house
Not a creature was stirring, not even a mouse;
The stockings were hung by the chimney with care,
In hopes that St. Nicholas soon would be there;

The children were nestled all snug in their beds,
While visions of sugar-plums danced in their heads;
And Mamma in her kerchief, and I in my cap,
Had just settled our brains for a long winter nap;
When out on the lawn there arose such a clatter,
I sprang from my bed to see what was the matter.
Away to the window I flew like a flash,
Tore open the shutters and threw up the sash.
The moon, on the breast of the new-fallen snow,
Gave a lustre of midday to objects below;
When, what to my wondering eyes should appear,
But a miniature sleigh and eight tiny reindeer,
With a little old driver, so lively and quick,
I knew in a moment it must be St. Nick.
More rapid than eagles his coursers they came,
And he whistled, and shouted, and called them by name:
"Now, Dasher! now, Dancer! now, Prancer and Vixen
On! Comet, on! Cupid, on! Dunder and Blixen —
To the top of the porch, to the top of the wall!
Now, dash away, dash away, dash away all!"
As dry leaves that before the wild hurricane fly,
When they meet with an obstacle, mount to the sky,
So, up to the house-top the coursers they flew,
With the sleigh full of toys — and St. Nicholas too.
And then in a twinkling I heard on the roof
The prancing and pawing of each little hoof.
As I drew in my head, and was turning around,
Down the chimney St. Nicholas came with a bound.
He was dressed all in fur from his head to his foot,
And his clothes were all tarnished with ashes and soot;
A bundle of toys he had flung on his back,
And he looked like a peddler just opening his pack.
His eyes how they twinkled! his dimples how merry!
His cheeks were like roses, his nose like a cherry;
His droll little mouth was drawn up like a bow,
And the beard on his chin was as white as the snow.
The stump of a pipe he held tight in his teeth,
And the smoke, it encircled his head like a wreath.
He had a broad face and a little round belly
That shook, when he laughed, like a bowl full of jelly.
He was chubby and plump — a right jolly old elf;
And I laughed when I saw him, in spite of myself.
A wink of his eye, and a twist of his head,
Soon gave me to know I had nothing to dread.
He spoke not a word, but went straight to his work,
And filled all the stockings; then turned with a jerk,
And laying his finger aside of his nose,
And giving a nod, up the chimney he rose.
He sprang to his sleigh, to his team gave a whistle;
And away they all flew like the down of a thistle;
But I heard him exclaim, ere he drove out of sight,
"Happy Christmas to all, and to all a good-night!"

THE LOVE KNOT

The following poem by Nora Perry is full of a rollicking rhythm that has a certain charm.

TYING her bonnet under her chin,
She tied her raven ringlets in;
But not alone in its silken snare
Did she catch her lovely floating hair,
For, tying her bonnet under her chin,
She tied a young man's heart within.

They were strolling together up the hill,
Where the wind comes blowing merry and chill;
And it blew the curls a frolicsome race,
All over the happy peach-colour'd face,
Till, scolding and laughing, she tied them in,
Under her beautiful dimpled chin.

. . . . . .

And it blew a colour, bright as the bloom
Of the pinkest fuchsia's tossing plume,
All over the cheeks of the prettiest girl
That ever imprison'd a romping curl,
Or, tying her bonnet under her chin,
Tied a young man's heart within.

Steeper and steeper grew the hill;
Madder, merrier, chillier still
The western wind blew down, and play'd
The wildest tricks with the little maid,
As, tying her bonnet under her chin,
She tied a young man's heart within.

O western wind, do you think it was fair
To play such tricks with her floating hair?
To gladly, gleefully do your best
To blow her against the young man's breast,
Where he as gladly folded her in;
And kissed her mouth and dimpled chin?

THE STORIES OF CAPTAIN MARRYAT

"JACOB FAITHFUL" is a story with two "morals." Its first moral is that, with the advantages of good education and good principle, there is every reason to hope and every right to expect that we shall do well in this world. The other is, that, as one of the characters in the novel says, "There is no such thing in this world as independence, unless in a savage state. In society we are all mutually dependent upon each other. Independence of mind we may have, but no more." "Midshipman Easy" is also a story that teaches a lesson while it entertains us, and its lesson is that the "equality of man" is only a theory, as we find in life that all men are not equal in ability, any more than in body or in character.

JACOB FAITHFUL

The Waif of the Thames and How He Rose in Life

CONTINUED FROM 2165

JACOB was the only surviving son of humble toilers on the Thames. He was born and lived on the river, or rather on a barge, and his parents met with an untimely death through their intemperate habits When they died Jacob was eleven years old; a young savage who knew not how to read or write—nothing, in fact, beyond a few sayings of his father, the meanings of certain signs used by his father to indicate cargo and quantities, the ability to navigate a barge or lighter, and an acquaintance with the river. The chief of the sayings referred to were, "It's no use crying; what's done can't be helped"; "Take it coolly"; and "Better luck next time." His sad lot awakened the sympathy of the proprietor of the lighter and his wife and little daughter. The proprietor's name was Mr. Drummond. Here is the account of what happened at the first interview Jacob had with his new friends:

"Have you any friends, my poor boy?" inquired the lady.

"No."

"What! No relations on shore?"

"I never was on shore before in my life."

"Do you know that you are a destitute orphan?"

"What's that?"

"That you have no father or mother," said the little girl.

"Well," replied he, in his father's words, having no answer more appropriate, "it's no use crying; what's done can't be helped."

"But what do you intend to do now?" inquired the proprietor, looking hard at him after his previous answer.

"Don't know, I'm sure. Take it coolly," he replied, whimpering.

"What a very odd child!" observed the lady. "Is he aware of the extent of his misfortune?"

"Better luck next time, missus," he answered, wiping his eyes with the back of his hand.

"What strange answers from a child who has shown so much feeling!" observed the proprietor to his wife. "What is your name?"

"Jacob Faithful."

"Can you write or read?"

"No," he said, again using his father's words; "no, I can't; I wish I could."

"Very well, my poor boy, we'll see what's to be done," said the proprietor.

A public subscription was raised on behalf of the little waif, and when decent clothes had been provided for him, he was one day summoned into the parlour of the proprietor's house. We shall have the story of what happened in his own words.

"Mr. Drummond and his wife surveyed me in my altered habiliments, and amused themselves at my awkwardness, at the same time that they admired my well-knit, compact, and straight figure, set off by a fit, in my opinion, much too strait. Their little daughter Sarah, who often spoke to me, went up and whispered to her mother. 'You must ask papa,' was the reply. Another whisper, and a kiss, and

Mr. Drummond told me that I should dine with them. In a few minutes I followed them into the dining-room, and, for the first time, I was seated to a repast which could boast of some of the supernumerary comforts of civilised life. There I sat, perched on a chair, with my feet swinging close to the carpet, glowing with heat from the compression of my clothes, and the novelty of my situation, and all that was around me.

"Mr. Drummond helped me to some scalding soup, and a silver spoon was put into my hand, which I twisted round and round, looking at my face reflected in miniature on its polish.

WHAT HAPPENED WHEN JACOB FIRST TRIED TO USE A SPOON

"'Now, Jacob, you must eat the soup with the spoon,' said little Sarah, laughing; 'we shall all be done. Be quick.'

"'Take it coolly,' replied I, digging my spoon into the burning preparation, and tossing it into my mouth. The result can be imagined.

"'The poor boy has been shamefully neglected,' observed the good-natured Mrs. Drummond. 'Come, Jacob, sit down and try it again; it will not burn you now.'

"'Better luck next time,' said I, shoving in a portion of it, with a great deal of tremulous hesitation, and spilling one half of it in its transit. It was now cool, but I did not get on very fast; I held my spoon awry, and soiled my clothes.

"Mrs. Drummond interfered, and kindly showed me how to proceed; when Mr. Drummond said: 'Let the boy eat it after his own fashion, my dear—only, be quick, Jacob, for we are waiting.'

JACOB FAITHFUL FEELS THE BURDEN AND SHAME OF HIS IGNORANCE

"'Then I see no good losing so much of it, taking it in tale,' observed I, 'when I can ship it all in bulk in a minute.' I laid down my spoon, and, stooping my head, applied my mouth to the edge of the plate, and sucked the remainder down my throat without spilling a drop. I looked up for approbation, and was very much astounded to hear Mrs. Drummond quietly observe: 'That is not the way to eat soup.'

"I made so many blunders during the meal that little Sarah was in a continued roar of laughter; and I felt so miserable that I heartily wished myself again in my dog-kennel on board the lighter, gnawing biscuit in all the happiness of content, and dignity of simplicity.

"For the first time I felt the pangs of humiliation. Ignorance is not always debasing. On board of the lighter I was sufficient for myself, my company, and my duties. I felt an elasticity of mind, a respect for myself, and a consciousness of power, as the immense mass was guided through the waters by my single arm. There, without being able to analyse my feelings, I was a spirit guiding a little world; and now, at this table, and in company with rational and well-informed beings, I felt humiliated and degraded; my heart was overflowing with shame, and at one unusually loud laugh of the little Sarah the heaped-up measure of my anguish overflowed, and I burst into a passion of tears.

"As I lay with my head upon the tablecloth, regardless of those decencies I had so much feared, and awake only to a deep sense of wounded pride, each sob coming from the very core of my heart, I felt a soft breathing warm upon my cheek, that caused me to look up timidly, and I beheld the glowing and beautiful face of little Sarah.

HOW JACOB CAME TO FEEL THAT HE WAS OF SOME VALUE IN THE WORLD

"Her eyes were filled with tears, and were looking so softly and beseechingly at me that I felt at once I was of some value, and panted to be of more.

"'I won't laugh at you any more.' said she; 'so don't cry, Jacob.'

"'No more I will,' replied I, cheering up. She remained standing by me, and I felt grateful. 'The first time I get a piece of wood,' whispered I, 'I'll cut you out a barge.'

"'Oh, papa! Jacob says he'll cut me out a barge.'

"'That boy has a heart,' said Mr. Drummond to his wife.

"'But will it swim, Jacob?' inquired the little girl.

"'Yes; and if it's *lopsided*, call me a lubber.'

"'What's lopsided, and what's a lubber?' replied Sarah.

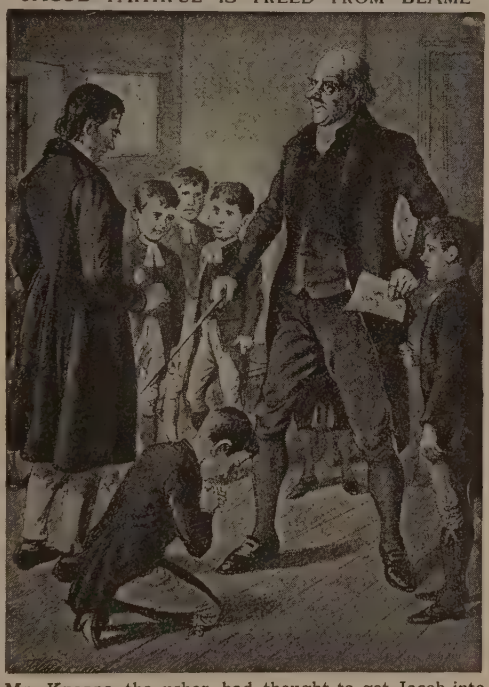
"'Why, don't you know?' cried I. And I felt my confidence return when

I found that in this little instance I knew more than she did."

Through the influence of Mr. Drummond, Jacob entered a charity school at Brentford, where he stayed until he was fourteen years old. A diverting account is given of his experiences, which were not all of a pleasant character. But after the initial difficulties were smoothed away, he made rapid progress with his studies and became a favourite pupil of the master, Dominie Dobbs, one of the most attractive schoolmasters in the old school of fiction—a man full of classic learning, singularly absent-minded at times, but with a heart of the kindliest.

Good old Dominie Dobbs had rather a long nose, and the boys who could draw were apt to make sketches of him with his nose exaggerated. One of these young rascals made many such comic pictures, and an usher at the school, named Knapps, who did not care for Jacob, schemed to get the latter into disgrace by representing him as having thus made fun of the kind old master, who loved the boy for his frank and fresh character. But Jacob was able to prove he had not made fun of his master, and the real culprit confessed, to the joy of the Dominie, who could not believe Jacob guilty.

JACOB FAITHFUL IS FREED FROM BLAME



Mr. Knapps, the usher, had thought to get Jacob into trouble by making the kind-hearted Dominie Dobbs believe that Jacob had drawn the comic pictures, one of which made fun of the master's long nose; but Barnaby Bracegirdle confessed he drew them, and Jacob was freed from blame.

When Jacob had completed his fourteenth year, Mr. Drummond apprenticed him to a waterman, and he returned to the life of the river. Here is Jacob's account of what his schoolmaster said to him in bidding him farewell.

"Jacob, thou hast profited well by the lessons which I have bestowed on thee. There are many who will tell thee that thy knowledge is of no use, for what avail can the Latin tongue be to a boy on board of a lighter? Others may think that I have done wrong thus to instruct thee, as thy knowledge may render thee vain or discontented with thy situation in life. Such is too often the case, I grant; but it is because education is not so general as it ought to be. Were all educated, the superiority acquired or presumed upon by education would be lost, and the nation would not only be wiser, but happier.

"Jacob, I feel that thou wilt not be spoilt by the knowledge instilled into thee; but, mark me, parade it not, for it will be vanity and make thee enemies. Cultivate thyself as much as thou canst, but in due season—thy duties to thy employers must be first attended to—but treasure up what thou hast, and lay up more when thou canst. Consider it as hidden wealth, which may hereafter be advantageously employed. Thou art now but an apprentice on a barge; but what may thou not be, Jacob, if thou art diligent — if thou fear God, and be honest?"

In the early part of his apprenticeship Jacob Faithful followed very closely the precepts of his old instructor. Then there came a crisis in his career. He had been induced to take up a temporary position in the counting-house of Mr. Drummond. This led to a false charge being brought against him by a new head clerk. The charge not being dismissed as readily by his employer as he thought it should have been, Jacob resolved that never again would he be beholden to Mr. Drummond for favours. He would be

independent. He explained the facts leading to the charge to his little friend Sarah, but nothing would induce him for a long time to approach Mr. Drummond again.

Meanwhile, he made the acquaintance of an old whaling captain, named Turnbull, whose life he saved. Then he was "pressed" into the Navy. After some exciting adventures, he was left a large fortune by Captain Turnbull, and by this time he had found out how impossible it is for anyone to be independent of one's fellows, and of the mistake he had made with regard to the action of his employer.

When we leave him, he had justified his old schoolmaster's faith in him, and one of his first real friends, Sarah Drummond, had become Mrs. Faithful.

MIDSHIPMAN EASY

And What He Thought About the "Rights of Man"

MASTER JOHN EASY was the son of Mr. Nicodemus Easy, a gentleman of wealth, who prided himself upon being also something of a philosopher. Master Easy was a spoilt child, and when the family doctor touched upon the subject of his going to school, the father raised curious objections.

"The great objection I have to sending a boy to school," said Mr. Easy, "is, that I consider that the discipline enforced is not only contrary to the rights of men, but also in opposition to all sound sense and common judgment. No, sir, without they can teach without resorting to such a fundamental error as flogging, my boy shall never go to school"—a sentence that shows Mr. Easy had not been sufficiently educated himself.

JACK EASY ARGUES UP THE APPLE-TREE

But Dr. Middleton knowing of a school where the birch was not used, and giving other good reasons why the boy should be sent to school, Mr. Easy at length consented to follow the doctor's advice. He announced his decision to Mrs. Easy on the following day at tea-time.

"To school, Mr. Easy? What, send Johnny to school? Why, he almost reads already! Surely I can teach him that? Johnny, dear, come here. Tell me, now, what's the letter A? You were singing it in the garden this morning."

"I want some sugar," replied Johnny, stretching his arm over the table to the sugar-basin, which was out of his reach.

"Well, my love, you shall have a great lump if you will tell me what's the letter A."

"A was an archer, and shot at a frog," replied Johnny in a surly tone.

"There now, Mr. Easy; and he can go through the whole alphabet! Can't he, Sarah?"

"That he can, the dear! Can't you, Johnny, dear?"

"No," replied Johnny.

"Yes, you can, my love; you know what's the letter B. Now don't you?"

"Yes," replied Johnny.

"There, Mr. Easy, you see what the boy knows, and how obedient he is, too! Come, Johnny, dear, tell us what was B."

"No, I won't!" replied Johnny. "I want some more sugar." And Johnny, who had climbed on a chair, spread himself over the table to reach it.

"Mercy, Sarah! Pull him off; he'll upset the urn!" screamed Mrs. Easy.

Sarah caught hold of Johnny to pull him back, but Johnny, resisting the interference, turned round on his back

as he lay on the table, and kicked Sarah in the face, just as she made another desperate grasp at him. The rebound from the kick, given as he lay on a smooth mahogany table, brought Johnny's head in contact with the urn, which was upset in the opposite direction, and, notwithstanding a rapid movement on the part of Mr. Easy, he received a sufficient portion of boiling liquid on his legs to scald him severely, and induce him to behave altogether in a very unphilosophical way.

How Nicodemus Easy forgot for a moment the "Rights of Man"

In the meantime Sarah and Mrs. Easy had caught up Johnny, and were both holding him at the same time, exclaiming and lamenting. The pain of the scald, and the indifference shown towards him, were too much for Mr. Easy's temper to put up with. He snatched Johnny out of their arms, and, quite forgetting his equality and rights of man, belaboured him without mercy. Sarah flew in to interfere, and received a blow which not only made her see a thousand stars, but sent her reeling on the floor. Mrs. Easy went off into hysterics, and Johnny howled so as to be heard at a quarter of a mile.

At this moment Dr. Middleton put in an appearance; and the next day Johnny was put into the doctor's chariot and taken to school. At Mr. Bonnycastle's establishment no birch was used—that worthy schoolmaster relied on the cane! And it was not long before Johnny, being a bright boy mentally, began both to recognise discipline, under the shadow of the birch-rod, and to make rapid progress with his studies.

How master Easy's passion for disputing got him into trouble

Now, at each vacation Mr. Easy attempted to instil into his son's mind "the rights of man." And thus was our hero educated until he was sixteen and exceedingly fond of argument; indeed, he could out-talk his father. With his master he never attempted to "argue the point," but he was in the habit of arguing with all the boys until it ended in a fight, which decided the point in dispute.

One morning, when he had been fishing in the river without any success, he observed a large pond which had the appearance of being well stocked. He jumped the park palings, and threw in his line. He had pulled up several fine fish when he was accosted by the proprietor, accompanied by a couple of keepers.

"Pray, sir, may I inquire whether you are aware that you are trespassing?"

"The word trespass, my dear sir," replied Jack, "will admit of much argument, and I will divide it into three heads. It implies, according to the conventional meaning, coming without permission upon the land or property of another. Now, sir, the question may all be resolved in the following: Was not the world made for all? And has anyone, or any portion of its inhabitants, an exclusive right to claim any part of it as his property? If you please, I have laid down the proposition, and we will now argue the point."

The gentleman who had accosted Jack had heard of Mr. Easy and his arguments. He was, besides, a humorist, and more inclined to laugh than to be angry.

Jack's unsuccessful attempt to argue with an angry gentleman

So the argument proceeded until Jack admitted that if two men chased the same animal, and both came up to it at the same time, the strongest would bear it off.

"Well, then," Jack was asked, "where is your equality?"

"That," said Jack, "does not disprove that men were intended to be equal; it only proves that they are not so. Neither does it disprove that everything was made for the benefit of all; it only proves that the strong will take advantage of the weak, which is very natural."

In the result Jack was deprived not only of the fish he had taken, but also of his fishing-rod, the proprietor being the "stronger party."

A few days afterwards he had an even more uncomfortable experience. He discovered on the other side of the hedge an apple-tree bearing tempting fruit, and he immediately broke through the hedge and, climbing the tree, began to eat.

Called to account by the farmer, he proceeded to argue the point.

"My good man," said he, "it is quite a prejudice on your part to imagine that apples were not given, as well as all other fruit, for the

benefit of us all. They are common property, believe me."

But the farmer had no time to argue. Calling a boy, he sent him to the farm-house, whence he returned with a large bulldog. "Mark him, Cæsar!" said the farmer to the dog, referring to Jack.

The dog crouched down on the grass, with his head up and eyes glaring at Jack, showing a range of teeth that drove his philosophy out of his head.

JACK'S ADVENTURE WITH THE BULLDOG AND THE WILD BULL

For a little while Jack was left ruminating. Then another ruminating animal, a bull, who had been turned out in the orchard, put in an appearance and advanced towards Cæsar. A combat proceeded on the side of the hedge at which Jack had gained admission. Jack prepared to make his escape in another direction, though the hedge there joined on to the garden near the farm. He was slipping down the trunk of the apple-tree when he heard a tremendous roar. The dog had been tossed by the bull.

Jack took to his heels; but the bull saw him, and bounded after him. Jack gained and flew over the hedge just as the enraged animal drove his head into it. Whilst the bull fell into a saw-pit, Jack upset two hives of bees; and, half blinded by their stings, he stumbled over the brickwork of a well. Fortunately for him, he seized the chain in his descent to the bottom, and finally made himself as comfortable as he could in the bucket.

JACK FALLS DOWN A DEEP WELL AND IS DRAWN UP IN THE BUCKET

The bucket was drawn up by a maid and a farm-hand, who, when they saw Jack at the top, fled in fright, letting the bucket again descend. The man was struck on the jaw with the winch, and the maid, running into the kitchen, fell on sundry heaps of dough waiting to be baked in the oven. It was not till the farmer made his appearance that the servant and the farm-hand regained their senses. The farmer then went to the well, and Jack was drawn up, half dead with cold.

When he had recovered, he was asked his name, and it appeared that Mr. Easy was the farmer's landlord.

"Why," said the farmer, "you might have picked the whole orchard, and welcome, had you told me at the time."

Jack argued that all the trouble arose because the farmer would not listen to argument; but the farmer only replied that if Jack preferred to steal apples instead of asking for them he might do so, and should not be interfered with.

These experiences induced Jack to believe that his father's philosophy would not work on shore, so he persuaded his father to let him go to sea. Happily he went on board a ship the captain of which, besides being a good-tempered officer, was especially indebted to Mr. Easy.

Jack was four years at sea, during which period he was completely cured of his ideas of "equality."

While at sea the news came of his mother's death. This event was followed by Mr. Easy filling his house with all sorts of rascals who took advantage of his belief in the "rights of man." Jack returned home, secured the legal right to the control of his father's affairs, sent these interlopers away, and obtained the arrears from tenants who had not paid their rents.

JACK BECOMES COMMANDER OF A PRIVATEER AND WINS A WIFE

Then he bought a brigantine with "letters of marque," which means that he became a privateer, or a commander licensed by the Government to attack the ships of Spain, with which England was then at war. After seeing active service in command of this vessel, he brought home as his wife a beautiful Spanish lady, to whom he had given her liberty when on an earlier occasion he had found her on board a vessel captured as a prize.

Meanwhile his father died a victim to a curious invention for altering the "bumps" of people's heads, but not before his son had had an opportunity of proving that he could now argue as well against equality as he had formerly argued for it.

"Were," he said, "all equal in beauty, there would be no beauty, for beauty is only by comparison; were all equal in strength, conflicts would be interminable; were all equal in rank and power and possessions, the greatest charms of existence would be destroyed, generosity, gratitude, and half the finer virtues would be unknown."

The next stories of Famous Books begin on page 2285.

A WOMAN AGAINST A KING

CONTINUED FROM 2002

THE Earl of Nithsdale was condemned to death for trying to put James, the Old Pretender, on the throne in 1715. His wife heard of his imprisonment in the Tower, and came up to London from Scotland, travelling through deep snows. But the Governor of the Tower would only allow her to enter on condition that she remained a prisoner. However, she could not then have helped her husband; so she bribed the guards, got admission daily, and quite won their confidence.

After fruitless attempts to obtain a pardon from King George I., Lady Nithsdale made up her mind twenty-four hours before the time of execution that she would help her husband to escape. At first he would not listen to her plan, lest it should endanger her, but at last he yielded.

The evening before the date fixed for the execution of the earl and other prisoners, Lady Nithsdale took two women with her into the Tower, and in turn brought them to her husband's room to take farewell of him. The first, a Mrs. Mills, wore concealed garments, which the second, Mrs. Morgan, put on when quitting the Tower; for Mrs. Morgan took off the outer garments she wore and Lady Nithsdale put them on her husband. Every little detail was thought out beforehand, and the cleverness, skill, and presence of mind shown by this resolute woman were very remarkable. Mrs. Mills was directed to come in, crying and afflicted with grief, so that when Lord Nithsdale, who personated her, went out, he did so wearing a hood and with his face buried in a handkerchief to cover up his beard. Lady Nithsdale walked close behind him for a little distance to conceal his manly gait, and then returned to his empty room. The pretended Mrs. Mills had been hurried off to fetch Lady Nithsdale's maid.

In the deserted room, Lady Nithsdale carried on a pretended conversation with her husband, asking questions and imitating his voice in answer, as well as striding up and down to make the people in the outer room think her husband was still there. Thus she allowed time for him to get clear of the Tower; then she opened the door, and, standing half in the room with hands on the door, took a pretended farewell for the night, pulled the string through the latch of the door so that it could only open on the inside, and, telling the servant he need not trouble to take in candles, passed down the stairs and drove off in a coach.

The whole story, related by Lady Nithsdale some time after, shows wonderful self-control, skilful acting, and self-sacrifice, for she was hazarding her own life. King George was furious when he found what she had done, and issued orders for her arrest; but she escaped by her own clever wits, fetched her little boy from Scotland, and joined her husband in France. To this day her descendants treasure the shawl used as part of the disguise worn by the earl.

THE GIRL WHO WALKED TO LONDON

THE girl about whom this story tells was born nearly two hundred years ago. She was the daughter of quite poor people, who were living in Scotland. Now, there was a law made at that time which was very unjust, and the punishment for breaking this law was death. Our heroine, whose name was Helen Walker, had a younger sister whom she loved very fondly, and this sister was charged with breaking the cruel law; and, though she was innocent, it was almost certain she would be condemned.

But it so happened that if Helen had been willing to tell the judges a falsehood, which no one could ever have found out, her story would have been taken as a proof that her sister had not done what she was accused of. She could have saved her sister by telling a lie, and no one would have known.

But Helen had been taught that there is nothing in the world which can make it right to tell a lie. She would have given her own life gladly to save her sister; but she could not have uttered a falsehood to save herself, and she would not utter a falsehood to save her sister. The sister was not like that, and, when Helen went to see her in prison, she pleaded passionately, begging her to tell the lie, and reproaching her for her cruelty in refusing to do so easy a thing merely because it was wrong. Some people, too, would have told her that it would not really be wrong with so good a reason for it. But Helen would not do it, in spite of all temptation.

But, if she would not lie, there was still one way in which she might perhaps save her sister. The judges would condemn her to death; but if Helen could win the King's pardon she would be set free. But what chance was there of getting the King's pardon? The King lived in London, hundreds of miles away. How could a poor girl in Edinburgh get to the King in London? To go from Edinburgh to London nowadays does not seem very alarming, but two hundred years ago it was a very different thing. There were no trains. Great people could go in their carriages, or gentlemen might go on horseback; people who could afford it might take the coach. But there was nothing for a poor girl like Helen but to tramp the whole long journey on foot, day after day, with just the chance of a friendly lift from a cart now and then; so the journey would be weary and long. Worse than that, it would be dangerous, for in those days highwaymen and footpads and tramps often attacked people who were going along the country roads alone. But it was the only chance of saving her sister, and, starting on her long walk, she did reach London in safety.

Now, in London there was a great Scottish lord living, the Duke of Argyll, to whom Helen's father had once done some service. So, when she got there, Helen sent a letter to the duke to entreat him to help her to get speech with the Queen, for the King himself was away from England. The duke admired her courage and her truthfulness so much that he did help her. And when she came before the Queen, she pleaded so movingly, showing that her sister was really innocent, that she persuaded the Queen; and the pardon was granted.

This is a true story, and out of it Sir Walter Scott made up the story of "The Heart of Midlothian," which is told on page 1757; and so, because his heroine, Jeannie Deans, will never be forgotten, the fame of the real Jeannie—Helen Walker—and of her golden deed will live for ever.

The next Golden Deeds are on page 2317.

WHAT THIS STORY TELLS US

WE have already studied the use and care of the teeth. Besides the teeth, however, there is much more of interest and importance in the mouth. In these pages we study the lips, the lining of the mouth, and the fluid which it produces, and we learn that when we eat there pours into the mouth something that makes chemical change in the food to prepare it for its entry into our blood. The importance of chewing is that it helps this saliva to do its work upon the food. The last part of the mouth we have to study is the tongue, a wonderful muscular organ which is of the greatest importance not only in speaking, but also eating and tasting. We learn here, also, about the different kinds of taste, and why it is good for us that we are able to taste at all.

THE MOUTH AND EATING

CONTINUED FROM 2100

THE lips are very interesting and important. They should meet so that the mouth is closed, except when we eat or speak. The mouth is not meant for breathing, as we have seen. The lips are very richly supplied with nerves. That is one reason why they are sensitive and pleasant to kiss with. Their rich supply of nerves, making them sensitive, is also valuable because they are the guardians of this entrance to the body; and grit, and prickly things, and anything that is not fit for food, is delicately felt and recognised by the lips, which close and refuse to allow the unsuitable thing to enter, or else spit it out. It is very interesting and instructive, in the case of very small children, though it may annoy their parents, to see how quickly their lips detect and reject anything which they do not think suitable to swallow.

The lips are lined with very thin and delicate skin, and as this passes into the mouth it changes into another kind of surface, called a mucous membrane. The lining of the mouth—and of most of the interior surfaces of the body—is called by this name because it produces a smooth, thickish stuff called mucus. This is a most valuable material, though it is rather troublesome when we have a cold, and our noses produce too much of it. It catches microbes, so that they do not penetrate beneath it; and it is slightly antiseptic, or poisonous to microbes. It catches dust, too. It ensures that, for instance, the inner surface of the lip and the surface of the gum shall move smoothly and easily against each other, and shall not stick. It is thus like the "lubricating oil" that is put into machinery—say, into the bearings, of a bicycle or a motor-car—so that it may work smoothly. Also it covers over our food before we swallow it, so that it slides down smoothly and easily.

The production of mucus by the mucous membrane of the mouth is under the control of the nervous system, and can be disturbed by worry or fear, so that the mouth becomes dry and we can hardly swallow. Sometimes in India when one of a number of people is suspected of having stolen something, they are all made to take a mouthful of some dry food, like grain or rice, and are told to swallow it. The guilty person's brain is frightened and upset, and he cannot produce enough mucus to soften and coat his mouthful, and the consequence is that he cannot swallow it, and so is found out.

Into the mouth there also pours, when we eat, or see something we want to eat, a quantity of a very watery fluid, quite different from mucus, which is called saliva, or spittle. That is why we say our "mouth waters"

when we see something nice. Saliva is not produced in the mouth, but in special glands that lie in front of the ear, and also under the jaw—three in all on each side. They are called the salivary glands, and in poisonous serpents they produce the poison. The teeth that lie nearest the openings of these glands are usually the last to decay, since saliva is alkaline, and, as we have seen, combines with the acids that would destroy the teeth—so that they are saved.

WHAT MUST HAPPEN TO OUR FOOD BEFORE IT CAN BRING US STRENGTH

We have lately learned that saliva is very important indeed. It is not merely that it softens the food. It contains a special ferment, a very complicated chemical substance which has the power of turning starch into sugar. It can do nothing else; but there is starchy material in most of our food, and this starch must be fermented into sugar before it can be used by the body. In fermenting it is made into a liquid, and this helps to break up the food so that the rest can be more easily digested—that is, fermented—when it reaches the stomach. The stomach has no power whatever to digest starch, and so it is a very serious matter if enough saliva, containing the starch-ferment, is not produced in our mouths and thoroughly mixed with the food when we eat.

If we bolt our food, that is what happens; we lose the value of much of it, and often get indigestion. On the other hand, if we thoroughly chew our food we get plenty of saliva into our mouths. It has been proved that chewing brings the saliva into our mouths; indeed, we can notice this for ourselves.

HOW TO EAT—A VERY IMPORTANT THING THAT EVERYONE SHOULD KNOW

As we chew, saliva and food get mixed together; then a round lump of the mixture gets smoothly coated with mucus, and it is *now* ready to be swallowed, but not before. When it reaches the stomach, the starch is digested by the saliva and turned into sugar, in which form it can be taken into the blood and used to give us warmth and strength. The digestion or fermentation takes place in the stomach; not the stomach, however, but the salivary glands produce the ferment that does the digestion. Therefore this is the one part of the business of digesting our food that we have under our own control, for we can chew or not, as we please.

If this first stage in digestion is properly carried out, it helps all the rest, as we have seen, because the melting out of the starch from among the food enables the juices of the stomach to get at the rest of it; and in everyone but those who are really ill the whole business of digestion, from first to last, will go on well and easily *if* we have been wise enough to start it rightly by chewing our food properly. Everyone should know this, and every child should learn to chew. It does not take long before we get into the *habit* of chewing properly. If we take the trouble to attend to it at first, after a time the brain gets accustomed to making the jaws work properly before anything is swallowed, without our having to think about it. That is a good habit, and one of the best. Nor is it at all more difficult to learn than bad habits; and they are easy enough to learn, I am sorry to say.

PROPER EATING IS THE FOUNDATION OF GOOD HEALTH AND USEFULNESS

I know that we find it tiresome to be told, again and again, to chew our food properly before we swallow it; but the habit of breathing only through the nose, about which we have already read, and this habit of chewing properly, lie at the foundation of good health, which means the first condition of happiness and usefulness in this world. It would be a waste of time to study the body and learn how it is made, and how it works, if we could not thereby learn how to keep ourselves well; but we *can* so learn, and that is the best reason why we should study the body, even until we know a thousand facts about it for every one that we know yet. We know very little really, but we should act on what we do know, and then our *knowledge* becomes a better thing still, and that is *wisdom*.

I have not told you the name of the ferment in the saliva, nor the names of the various salivary glands, nor have I written the chemical equation which shows how starch is changed into sugar simply by combining water with it. These things are interesting, but they

do not matter. What really matters is to know what is our duty to our own bodies, and to do it.

But in studying the mouth we find, besides the lips that bind it, the mucous membrane that lines it, the teeth that arm it, and the saliva that pours into it, another wonderful organ, and that is the tongue.

THE CLEVERNESS OF THE TONGUE, WHICH HELPS US TO EAT AND TO SPEAK

There is scarcely any end to the usefulness of the tongue. That is true of the tongues of the lower animals even; but it is still more true of our tongues, as they are used by us for speaking with. So important is the tongue as an organ of speech that we often say "a foreign tongue" when we mean a foreign language, and even when we say language we refer to the tongue, for *lingua* is Latin for the tongue.

The tongue is really a group of muscles —some running along it from root to lip, some running across it, and so on. Any of these muscles can be used apart from the others, or in combination with them, so that we can move the whole tongue in any direction; we can lengthen it or shorten it, we can hollow it out to make a loud noise as a baby does when it cries, and as every good singer has to learn to do, or we can make it arch itself like the back of a cat, as we do when we pronounce the vowel e. It is one of the most remarkable things about our bodies that we can use for special human purposes, like speaking, organs which the lower animals have, and which were not originally meant for such purposes.

For the tongue's most ancient uses, to which we still put it, are quite different. It searches the mouth, and finds the food in it. In some animals, like monkeys that have cheek-pouches, it stows the food away till it is wanted. Little boys—and girls, too—sometimes use it for this purpose when they have sweets given to them.

THE WONDERFUL WAY IN WHICH THE TONGUE HELPS US AT MEALS

The tongue is used every time we swallow. It is the clever tongue that moves the food about so that it shall be properly caught between the various teeth, and cut up, and chewed; it is the tongue that rolls a portion of a mouthful into a round ball, slips it on to its own surface, far back, and then tosses it into the throat, where it is swallowed. Try to eat or to swallow without moving your tongue, and you will soon learn how useful it is.

The tongue, too, keeps the mouth clean and free from anything it does not want to swallow. It is the tongue that discovers the bone in the fish, and catches it and pushes it to the lips so that we can get rid of it. So, like the lips themselves, it is a sort of sentinel, letting pass into the interior of the body only what it thinks right. We do not use our tongues for washing anything but our mouths and the outside of our lips, but many animals use it as sponge, and towel, and nail-brush as well as tooth-brush—which is a purpose we all put it to. Watch a cat washing herself or her kittens, and see how useful her tongue is in this way. Then you may let your finger rub against the surface of her tongue, and you will find it very rough indeed. The cat's tongue is far rougher than ours, and here again is a lesson as to the kind of food we are best suited for. The cat is a carnivorous, or flesh-eating, animal, and its tongue is a rasper, or grater for flesh.

THE FOUR KINDS OF TASTE THAT THE TONGUE GIVES US

The tiger's tongue will draw blood from your arm if you allow it to lick you. When we examine the tongue of such an animal, we see that it is armed with a number of sharp things standing up from it, and curved backwards.

Our tongues are comparatively smooth, for we are certainly descended from creatures which were vegetarian, and did not need such rough tongues as the tiger scrapes his bones with when the keeper feeds him

But, beyond all these other uses, the tongue is wonderful because it is the organ of taste. It is covered with special little points, to which the nerves of taste run from the brain. These taste-bulbs, as they are called, are most abundant on the sides of the tongue and at its tip. They are much fewer on the back of the tongue, which is more used for rolling and throwing the food into the throat. Different parts of the tongue are different in their sensitiveness to different kinds of taste. There seem to be four principal kinds of taste, and it may be that there are special

nerves, and perhaps special taste-bulbs, in the tongue for each of these kinds. They are *sweet*, *salt*, *acid*, and *bitter*. Other tastes, which we cannot call exactly any of these four, are probably made up of mixtures of these, and also of smell. Smell has more to do with what we call the taste of our food than we fancy. When we have a cold and cannot smell, our food does not taste nearly so nice.

THE POWER OF TASTE AND ITS USES TO US ALL

We may notice that two of the classes of taste—acid and salt—correspond to two great classes of chemical compounds about which we read on page 1797 of this book. Sweet corresponds to the compounds called sugars; and bitter things perhaps belong to a special chemical class, too. We must never confuse *acid* with *bitter*, as many people do. They do not call bitter things acid, but often you may hear someone say that a thing is bitter when it is not bitter at all, but acid. They might just as well call it sweet. There is no resemblance at all between the taste of a lemon, which is acid, and the taste of quinine, which is bitter.

The tongue, then, besides being the principal organ of speech in human beings, is the organ of taste, and we should know what the use of the sense of taste is. We usually think of it as if it were just meant to give us *pleasure*. But none of our senses exist in the first place to give us pleasure. They exist for sheer usefulness. Music and beautiful sights give us pleasure; but the *first* use of the ear and the eye is that we may hear and see things, and so be helped in our actions. And though we use the sense of taste mainly for pleasure, its real business is the *use* of telling us what is and what is not fit to eat.

HOW THE TONGUE ACTS LIKE A SENTINEL TO GUARD US FROM HARM

Thus the tongue is a sentinel because it is the organ of taste as well as because it is an organ of touch, and can feel things, like bones, that it would hurt us to swallow. It is a sentinel *chemically*, because it tells us, by taste, what we require to know regarding the chemical composition of our food. It recognises sugar, and approves of it, because sugar is good for us. It recognises the things which are made in food when it goes bad, tells us that they are there, and that they are nasty. So we are saved from the harm they would often do to us if we swallowed them. The tongue, like every part of the body, may make mistakes; but the duty of telling us what is good and what is not is what the tongue exists for in so far as it is the organ of taste.

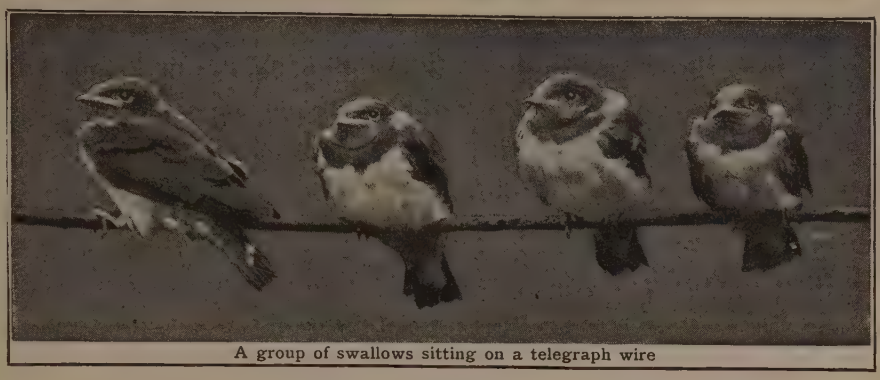
I do not think that the sense of taste exists in order to tempt us to eat. When we are really hungry, we can enjoy dry, stale bread, which has scarcely any taste. People who have lost their tongues or their sense of taste still get hungry, like other people. The power of taste exists not to persuade us to eat, but to help us to choose.

We see this when we say that a person has "good taste." We mean not that he is hungry for music, for instance, but that he *chooses* well between good music and bad music; and "good taste" in clothes does not mean that a man likes to be clothed—he likes that whether he has "good taste" or "bad taste"; it means that he chooses well between dull colours and beautiful colours, "loud" clothes and quiet clothes. Let us think of taste, then, as the chooser; and let us try not to cheat our tongues by adding large quantities of strong-tasting things to our food.

WHAT HAPPENS WHEN WE SWALLOW OUR FOOD

Lastly, the mouth and the tongue have the business of swallowing. When the food is prepared, but not before, it is placed on the back of the tongue near the throat. A hint is thus given to the brain, and the "swallowing-centre"—a group of nerve-cells in the brain which has this duty entrusted to it—gives orders which close the opening that leads to the lungs, raise the soft palate, or curtain, at the back of the roof of the mouth so that the food shall not pass into the nose, and contract the muscles of the throat in a regular wave, so that the food passes safely into the gullet. The gullet is a very long, muscular tube, which passes right through the chest, and through a passage in the diaphragm, finally opening into the stomach. This tube contracts from end to end, pushing the food along until, in four or five seconds, as a rule, it enters the stomach, where we must now leave it.

The next part of this is on page 2343.



A group of swallows sitting on a telegraph wire

FAMILIAR BIRD FRIENDS

CONTINUED FROM 2061

We come now to our last story about the birds, passing next to a trip into the lakes and rivers, and into the depths of the sea, returning afterwards to land to study some of the marvels of the insect world. We shall all miss from the story of the birds some of the friends in feathers in which we are interested. In a series of short stories like these it is impossible to deal with all the enormous number of birds that exist. All that we can hope to do is to spend pleasant hours in studying a little of the ways of birds whose lives and habits are interesting to the greatest number. Our stories serve as an introduction to the world of animal life; no stories can do more than that.

In speaking of common birds we have to deal with birds which should be common in our own land. Unfortunately, as we have so often seen in previous stories, the birds which should be among those most abundant are getting more and more uncommon, owing to the ruthless cruelty with which they are being destroyed.

One which becomes every year more scarce is our handsome, saucy friend the jay—a feathered prince of our woodlands in many parts of the country. There is no mistaking it for any other bird, for the jay is a big bird, nearly a foot in length from the beak to the tip of the tail, and with his tall crest and the bright blue and white plumage, and his loud, joyous, laughing call, he is quite a notable figure. If we fail to see him, he will make us know of his presence. With a loud, screaming squawk, he flutters off, arousing by his cry all the birds in the neighbourhood to the fact that one of those dreadful two-legged creatures which have clothes instead of feathers is on the prowl. As a destroyer of insects the jay is a blessing to the farmer. But he is such a hungry fellow that insects do not satisfy him. He must have the choicest fruit in the orchard, and should the eggs of song-birds or game-birds, or even young birds themselves, appear in his neighbourhood, the jay will have them. He is a member of the crow family, hence his hearty appetite.

Now, because he takes an egg or two, or even a bird or so, in the course of the year, farmers hunt the jay without mercy. They care nothing for the enormous good he does in cleansing crops of their burden of caterpillars.

There is another fact in favour of the blue-jay of which the farmer takes no account. This bird loves acorns. The scientific name of one species means noisy acorn lover When the acorns are ripe, the jay carries them from the oak-tree with a view to hiding them as a winter store. Some he does hide, others he drops because he is so ill-mannered

as to talk with his mouth full. Anyhow, from those acorns which jays and other birds have buried and forgotten, many of our oak trees have sprung. From an acorn an oak-tree will grow, and in due season it will yield thousands of other acorns, which other jays may take and hide for other oak-trees to grow from.

How the Birds Carry Seeds over the Ocean, and Plant Barren Islands

That brings us to a remarkable feature in the life-story of the birds. Men reap harvests which the birds have sown. Barren islands have been clothed with verdure from seeds which the birds have carried. Birds do not deliberately set forth upon a journey with a view to sowing seeds. In their annual migrations from country to country they carry with them seeds from land to land. The fruit that they eat contains seed which, when liberated, will grow. It will not grow, of course, if it has been digested by the bird; but if it has not been ground up or damaged in the bird's inside, it will grow when deposited on the land to which the bird has flown.

In the course of their journeys birds get blown far out of their course, and are often glad to rest on islands by the way. Thus the seeds which they have carried may be deposited there. It may happen even more unexpectedly. A bird may be caught by a hawk or other bird of prey when on its annual flight. In its crop may be the undigested food which it ate before setting out. The hawk may swallow this, but as it is not the food that the hawk wants, the seed will be cast up, with the feathers, in little pellets from the hawk's mouth, and so find a resting-place in the soil. In the course of a day a bird may have flown 500 miles with seeds in its crop. The hawk eats the bird and flies far to land before casting up the seed.

Eighty-two Plants that Grew from Earth Found on a Bird's Foot

Thus we see what a journey the seed may have travelled in a day. When it does reach the ground it will grow, if the soil and climate be favourable, and in that way a country gets a growth which it may never before have possessed. There is another way in which birds carry seeds. Clods of damp earth sometimes cling to their claws, and in these clods are tiny seeds. Darwin examined the leg of a red-shanked partridge to which was attached a ball of earth weighing 6½ ounces. The ball of earth had been kept hard, just as it was found, on the foot of the bird for three years. Darwin broke it up and found that it contained seed. He planted and watered them, and from the seed in the ball of earth which had stuck to that partridge's foot there grew up no fewer than eighty-two plants. Many other birds were examined by the same great man which had earth-clods attaching to their feet or the sides of their beaks. One had a piece of earth attaching which weighed only nine grains, but from it there grew and flowered a toad-rush.

Of course, not all the uninhabited islands upon which verdure grows have been sown in this way; wind and tides carry seed which live after many days' immersion in the water of the sea, but the birds for thousands and thousands of years have been doing their share, and the fact makes their migrations all the more interesting.

Why the Birds Leave in Autumn and Return in the Spring

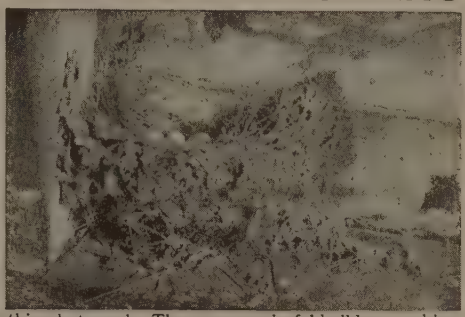
The migration of birds is a mystery to most of us. At about the same date every year our wanderers come home to us for the summer, and at about the same date every autumn they leave us. The going and returning may vary a little, if the weather be of an unusual character; but the journeys are sufficiently regular for us to be able to make up a little bird calendar, which reads something like this:

Name of Bird	Leaves Ohio (say)	When it Returns	Days Away
Cuckoo	August 25	April 14	232
Oriole	October 10	April 22	194
Martin	October 12	April 14	184
Swallow	October 15	April 10	177

The movements of the birds which come from colder climes to spend the winter with us may be timed in pretty much the same way, and it is possible to work out a list of the birds' travels just as it is to make a clock from the opening and shutting of flowers.

Why the birds migrate we know; how they are able to find their way as they do is another matter. When the summer passes, our fair-weather friends find their food growing rapidly scarce, and the weather getting too cold for

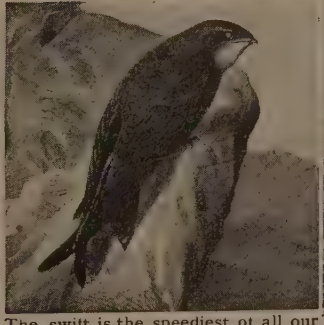
THE SWALLOWS THAT HERALD THE SPRING



The swallows eat nothing but insects, and cannot do anything but good. They are wonderful builders, making nests of mud beneath the eaves or roofs of barns, to which they carry the materials a beakful at a time.

Starlings work with fine appetites in ridding the fields of worms and grubs and all manner of things which would injure the crops. Then, when the fruit ripens, they think they are entitled to dessert, and help themselves.

The European house-martin builds close to the windows, making the neatest little home. Should the lodging be insecure it builds a solid foundation for its nest, resting the latter upon a pedestal of mud or clay.



The swift is the speediest of all our birds, and is built like a humming-bird. The Chinese eat certain swifts' nests.

*The jay is a noisy gentleman, from whose beak drop acorns which sow oak-forests. He eats birds' eggs.

Sand-martins are charming little birds, which build in sandstone cliffs and railway embankments.

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them. Therefore, instinct impels them to fly to lands where they know that the sun is shining and food abundant.

It is wonderful to think that the swifts or swallows which we see about the house on some fine morning midway through October will next day be revelling in the sunshine of Florida.

THE WONDERFUL WAY IN WHICH THE BIRDS COME BACK TO THEIR OLD HOMES

It is sad, of course, to be without them after they have gladdened us with their presence all the summer; but there is comfort in the thought that, all being well, the very same birds will come back to us in the spring. Yes, the same birds. The wood-thrush finds its way back to the bush on which its nest was made the year before, and the swift and swallow come back, year after year, to the very house where their nest was built. One swift is, to our eyes, exactly like another swift, so there may be a mistake, we think. To guard against error birds have been marked, and from the marks made upon them they have been identified as returning to the same house for seven years in succession.

Those people who tell us that the wind decides whither a bird shall fly, and that there is nothing wonderful in these migrations, are right up to a certain point. The birds may fly with the wind, which blows them south in the autumn; they may come back to us when the spring breezes, sweeping over the plains, carry the scent of our fair land into the heart of Mexico. This may be true, but the wind does not parcel out myriads of birds and dot them down all over America just at the particular spot where each bird desires to be. The "homing" instinct is as strong and wonderful in our swifts and swallows as in the homing pigeon.

THE LITTLE GIRL'S SECRET AND THE SECRET OF THE BIRDS

The birds are like the little girl who found the way to her home, a house in a street where all the houses were exactly alike. She could not explain how she found the house; all she knew was that in a certain house in that street there was her little yellow bed upstairs, and she went unerringly to the house which contained it. And it is to their little beds upstairs that the birds return year by year.

It is not hard to distinguish between swallows, swifts, and martins. The swift has long, sickle-like wings and a short tail. The swallow has long, pointed wings, but the distinguishing mark is its forked tail. This is the barn-swallow, whose nests are plastered up inside our barns, looking like little brackets of mud. It is blue-black above, and has a chestnut throat and breast. Then there is another something like it, but much smaller, and with a short, square-ended tail, which makes rows of bottle-shaped nests of mud outside the barn, close up under the eaves, and is called the eaves-swallow. The big purple martin, which nests in the houses on poles set up in the garden, is a near cousin of the swallow's. The swift, though of similar form, is really a relative of the humming-bird, as we might guess from its wonderfully swift flight. It makes its nest of little twigs glued together and to the wall inside a disused chimney; but before there were houses, the swallows nested on rocky ledges, and the martins and swifts in hollow trees. All these birds live on minute flies and other insects which they snap up as they sail and dart through the air.

BIRDS THAT BUILD IN TUNNELS AND NESTS THAT ARE GOOD TO EAT

The sand-martin is a smaller bird than these, has a shortish, forked tail, is brown on the back and wings, and white underneath, except the upper part of the breast, where brown again occurs. Its home is made in the sides of sand-pits, the banks of rivers, railway embankments, and so forth. It digs itself a neat little tunnel, eighteen or more inches in length, and there it lays its eggs and hatches its young in security. One martin, which does not come to America, makes a tube of mud beneath a rock or on a wall, and builds its nest at the top of this spout. Swifts' nests are made in holes in rocks, in crevices, in cliffs and walls, and very often in the thatched roofs of houses.

It is a member of the swift family which builds the famous eatable nests. The nest is made from a substance produced from the swift's mouth. It is all glued together and fastened to a rock in some wild cave. There men are let down by ropes to get the nests.

BIRD POSTMEN AND BEAUTY PIGEONS

The ring-dove is one of the tamest birds of its race. It will feed from the hand, and perch about its owner without the least fear. It is called turtle-dove, but the real turtle-dove is a beautiful wood-pigeon.

The homing pigeon flies hundreds of miles to its home, and can carry messages tied to its legs. In many places they have regular "pigeon-posts."

Pouter pigeons are strange birds which can inflate pouches in their breasts when angry or in love. Other pigeons can do so a little, but not like the pouters.

Here we have four popular breeds of pigeons. On the left is an Antwerp—a powerful flier like a homer. Next comes the short-billed turbit; then the trim magpie, and last the blue owl-pigeon. The latter three are fancy birds.

The fantails, which are generally white, expand their breasts and spread their tails like a fan, raising them over the back till they touch the back of the head.

There are many varieties of tumbler pigeons. One of the most costly is the short-faced tumbler. The shorter the beak the more valuable the bird for selling.

The photographs on these pages are by Charles Reid, R. B. Lodge, Lewis Medland, Henry Irving, and Underwood & Underwood, London.

The Chinese consider these nests a great delicacy. Millions of them are taken every year to China. The price is about ten shillings an ounce, and there are about three nests to the ounce. They are washed and stewed and made into soup, but it takes a Chinaman to like it. The nest of the British swallow is cup-shaped, and placed under a roof or down a chimney. It is composed of mud or clay, which the patient birds carry little by little from some convenient spot, then piece it together.

How the Starling Pays for the Damage He Does to the Fruit

Just as familiar as the swallows is the starling, a bird which thrives in England, and is becoming naturalised in America, showing us its glossy, sheeny feathers, with the purple and green metallic reflections and the countless brown spots. It is useless to deny that it is a robber of the orchards; but when the fruit is not ripe, the starling earns his place in the world. Starlings eat slugs, worms, and beetles of all sorts, which, if left alone, would overrun the farmer's lands. One quiet autumn afternoon, when there seemed to be very few starlings about a certain big garden in the country where they are very plentiful, some friends walked out along the road down to some fields. One of these had been newly ploughed. As the friends approached, there was a great commotion among the brown soil. It looked as if the whole surface of the field moved and rose. But in an instant the meaning was clear. Thousands upon thousands of starlings, which had been feasting upon the enemies of the farmer in that field, suddenly rose into the air and passed over the heads of the friends as they walked. For a minute they blotted out the sky. They had done a good afternoon's work for the farmer, even if they had taken toll of his fruit earlier in the autumn.

A Flying Column of Pigeons 200 Miles Long and a Mile Wide

Talking of this swarm of birds reminds us of one of the greatest swarms ever known, the swarms of the passenger pigeons in America. They used to pass over the country in multitudes which no man could number. One observer watched them during a journey of 54 miles. All the way the mighty flock of birds streamed over his head, in clouds which hid the sun, and for that day, and for three days following, the flight continued. Another scientist watched the birds in flight, and calculated that they made up a column a mile in width and about 200 miles in length. They were going to where food would be plentiful, so that they might build nests in the trees and bring up their young in the midst of abundant provisions. One of these nesting-places was measured. It covered a space twenty-eight miles long and from three to four miles wide. Every tree of any size in that great area was crowded with nests of these birds. That was a little over thirty years ago. Since then the woodman's axe has felled so many American trees, and the guns of men have killed such swarms of these birds, that the passenger pigeon of America is now becoming as scarce as the American bison.

We have another wild dove in this country to-day; but have more home-reared pigeons than wild ones. They are all descended from the parents of the blue rock-pigeons wild in England to-day.

The Parent of All Our Pigeons, the Rock-Pigeon of To-Day

The blue rock-pigeon is one of the birds whose plumage very seldom varies. Son is like father, and daughter is like mother. It is bluish grey, of a darker tone than that of what we call the blue homer; and across the closed wings run two broad, distinct bars of black. The neck of the bird is beautifully marked with blue and purple reflections. Indeed, the necks of most pigeons, wild and tame, would do credit, for sheer beauty of plumage, to a peacock. We may call the wild pigeons doves if we like. Doves *are* pigeons.

There are two sorts living in British woods. There is the stock-dove, or smaller wood-pigeon; and there is the ring-dove, the largest of the wild pigeons. This is a shy bird, but its increased numbers show what can be done where birds are kindly treated. It has become very numerous in the London parks; and in parts of London with gardens in which timber still stands, it is no uncommon sight, early in the morning, or late in the evening, to see these beautiful birds swoop down to pick up food which has been put

there for other birds. Not long ago two of these birds used to visit the London garden of people who did all they could to encourage the birds. Next year eight ring-doves were to be seen in and near that garden, showing that the birds had made their nests and reared their little ones in gardens within a few miles of the city.

The wild rock-pigeon eats small shell-fish from the seashore for a part of the year, but at other times it takes grain and seed. A good flock of them can do the farmer's crops some damage.

How the Struggle for Existence is Shared by Gentle Doves

The pretty cream buff-coloured doves which we keep at home must not be confused with the birds of which we have here been reading. They do not fly wild in this country. They are regarded as the gentlest of living creatures. But that is all nonsense. Birds are birds, and they all have their little tempers. Doves will peck little birds, just as the little birds which are pecked by the doves will peck birds smaller than themselves.

Just watch a couple of hen doves struggling for the same piece of material for their nests; they peck and beat each other with their wings with as much zeal as if they were a couple of robins. We must not think any the worse of them for that; they are charming birds to keep, affectionate and friendly with their masters, but their unending crooning may at times try the patience of the keenest bird-lover.

When we look at a first-class collection of pigeons, it is hard to believe that the neat and trim little rock-dove is the father of them all. See the great and lordly pouter with his huge swelling pouch. He stands high on feathered legs, with his head thrown back, and struts about, and claps his wings when flying as if he were the very lord of all the birds. Look, too, at the comical dignity of the fantail.

The Fantails and the Dragons and Other Handsome Show Pigeons

By careful breeding we have a bird of beautiful white, with a fine fan-like tail, which curves over its back so as to touch the back of its head. The dragons and carriers are just as proud, but in a more severe and stately way. They are not beauties, except in the eyes of the fanciers of these birds. The huge, coarse, fleshy wattles round the eyes and nose make the bird look as if the beak had been thrust through them.

Far more attractive of the quaint birds are the Jacobins and nuns, with their curious but pretty arrangement of neck feathers, fashioned like hoods and rosettes. We have pigeons with owl-like heads, pigeons with handsome little frills on their breasts, pigeons with feet and legs feathered like farmyard fowls. The least fanciful is the homer, which is the least removed in appearance from the rock-pigeon. Indeed, boys often buy trapped wild pigeons in the belief that they are getting home-bred birds, only to find that they can never train the strangers to remain. It is the nature of the rock-pigeon to fly away to its old home, and that is the nature of the homer. When they become accustomed to a place, they return to it just as the wild birds return from far lands to their old homes. Pigeons which have been trained to return from long distances to their lofts are taken away in baskets by train and over the sea, and then liberated. With the most wonderful instinct they return unerringly.

How the Pigeons Play the Part of Messengers of the Air

In many places they are trained to carry messages. A note is written on a thin piece of paper and tied to the bird's foot. The pigeon is then thrown up into the air, and away it flies to its home. If it is a well-trained bird it will fly at once to its loft, where a man will be waiting to receive it, to take the message and give the bird a good feed. Newspapers get reports in this way where the telegraph and telephone are impossible. The memory of these birds is remarkable. If we buy a couple of full-grown ones which have been used to flying, we may treat them with the greatest kindness for months, but the first time we let them out, away they fly to their old home. The only thing to do, if we buy old birds, is to let them hatch young ones, and train those. Then, if the old ones do eventually fly away, we shall not be left without pigeons; the young ones will not forsake the home in which they were born. The homer pigeons fly straight forward; they are long-distance birds, but there are others, of

the tumbler and tippler family, which will fly just as long, but always in wide, sweeping circles, round and round their home. For eight or nine hours at a time they keep in the air, affording a good answer to the question as to whether birds fly for enjoyment.

THE CHARMING FAMILY OF THE TITS AND SOME OF ITS FRIENDLY MEMBERS

We must leave the dovecote, with its scores of varieties of pigeons, its runts—giants of the pigeon family in Europe—its turbits and trumpeters, and all the other favourites. We must not forget to mention that in warmer lands they have beautiful crested fruit-eating pigeons, and other pigeons so gay in colour that they are called painted pigeons. But these do not appear in the ordinary American dovecote.

We pass now again into the open to take a peep at a charming family of the friendliest of birds, the titmice. These are little fellows, always alive from top to toe, and the very image of liveliness and good cheer. Europe is full of them, and very prettily dressed some of them are, and builders of wonderful nests; and there are others in other parts of the world. None, however, are more interesting and familiar than our own—the jolly little chick-a-dee, the clear-voiced crested "peto" of the Southern States, and half a dozen sorts gladden the hearts of the people in the Rocky Mountains and up and down the Pacific coast.

"I have finished my morning ramble, and am fairly seated in my study," writes Mr. Laugille, "when lo! a familiar voice calls me to the window. 'Chickadee-dee-dee, chick, chick, chickadee, chickadee-dee-dee'—most cheerful and winning voice of a winter's day! There they are, little black-capped titmice, or chickadees, finding a satisfactory repast in the frosted evergreens, where my eyes can detect nothing of the kind; standing upright, tipping forward, stretching upward, leaning to right and left, or hanging by their feet; so brimful of contentment, so sweet-spirited and confiding, with so much of the sunshine of hope in their voices, that they appear like bright and gracefully moving ornaments on the dark evergreens or leafless spray."

Our American titmice do not weave lovely pouches or delicate nests as do some of the foreign ones, but hunt up some deserted woodpecker's hole, or a convenient cranny in an old apple-tree, and after filling it with warm bedding, place in it half a dozen red-speckled eggs, from which presently come forth the oddest of little babies. Occasionally the tomtit will nip off a few fruit-buds in the spring, and some ripe fruit in the autumn, but we ought not to mind that; the buds or fruit which he has taken have contained insects, or he would not have wanted them. The tomtit is a terror to caterpillars. Two of them, which had a nest of young ones, were watched, and it was found that they carried caterpillars to their nest at the rate of thirty an hour all day long. We only want a few families of tomtits in the garden to lessen the work of the gardener and check the ravages of the caterpillars.

The long-tailed European tit has a very long tail. It has a white-crowned head and rich black back; the tail is black, but white-edged. This is the tit which makes the most wonderful bird-nest seen in England. It is marvellously formed, of soft, downy feathers, the webs of spiders, and the cocoons of caterpillars; while outside it are placed lichens, which match the trunk of the tree in which it is built, so making it hardly noticeable in its hiding-place.

HOW THE TAILOR BIRD WORKS WITH NEELE AND THREAD

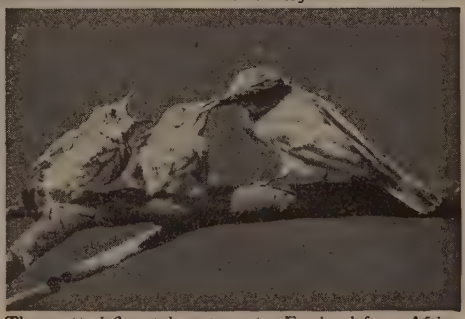
Talking of nests we must not forget that of the tailor-bird. It is one of our common birds, for its home is in the East, but it would be a shame quite to pass it over. The bird is quite a modest little creature, but it is a master craftsman. It sews together the edges of a big leaf hanging down from a branch If the leaf be too small, it stitches two together. How it learned to sew is a mystery; but sew it does. It collects strings of fibre or tough silk spun by caterpillars, or pieces of wool, and, using its beak as a needle, it threads these through and through the edges of the leaf, joining them together to form a sort of hanging cup.

Now for a word about the sparrow. There are more sparrows than any other birds in this country. They teem wherever we go, in the fields and parks, in crowded city streets and dismal alleys, Railway stations swarm with sparrows.

BIRDS OF THE STREETS, TREES, AND STREAMS

The sparrow goes everywhere and eats anything. With his perky, confident ways he cheers many a gloomy slum where no other bird could live, and thrives where daintier birds would die. In the country he has few friends.

The cole-tits are members of a popular family to be found in most parts of the Old World and the New. The long-tailed tit is the famous builder of the family.



The spotted flycatcher goes to England from Africa in May and hatches its young in June. It builds a neat nest and hides it with lichen and spiders' webs.

The blue titmouse is an untiring friend of the farmer. With its strong little claws it runs like a mouse over the fruit-trees, catching and eating the insects, which, if allowed to remain on the tree, would ruin the foliage and fruit.

There are nine species of wagtails. They love insects and catch minnows.

The great tit eats insects, but with his strong beak can kill small birds.

The nuthatch climbs like a woodpecker and digs insects out of trees.

the cabstands all have their own flocks. They build all about our houses, in the waterspouts, under the roofs, in outbuildings, in holes and corners, and in all imaginable places. Nothing discourages a sparrow. Painters, decorating the outside of the house where this is written, had to pull down a fat nest from behind a rainpipe. They gave the pipe a coat of paint, then went to work at the other side of the house. Next day, when they returned to the first side to give the pipes there another coat of paint, they found that the sparrows had rebuilt the nest which had been destroyed. The active little birds had been to a haystack near by, collected abundant material, and had re-established their house, not quite perfectly, but well enough to enable them to go on housekeeping.

It is around the sparrow that the great argument as to the value of birds centres. Men have formed a society whose members are pledged to kill rats and sparrows, and numerous clubs exist in the country solely for the slaughter of the poor sparrow.

WHAT HAPPENS TO THE FARMERS WHO KILL THEIR FRIENDS THE SPARROWS

The sparrow does steal much grain from the farmer. He is such a hungry little fellow that he robs without stint, and he even drives away birds more prized which he thinks may share his food. But when we resolve to destroy one of Nature's families, let us look back at what has happened to other people who have done a similar thing. The Government of Maine decided upon and carried out the slaughter of the sparrows some time ago, and in the following year, when there were few sparrows, the caterpillars multiplied so enormously that they not merely ate all the leaves of the fruit-trees, but actually killed the trees themselves. A similar thing happened in France. Therefore, let none of us take any share in trying to prove that men's ideas as to what should live and what should die are wiser than Nature's laws. If men did not kill the birds of prey there would be no plagues of sparrows or thrushes or starlings or any other birds. Men themselves upset the balance of Nature, and make matters worse by exterminating families of birds whose increase is the outcome of their folly and cruelty in regard to other birds. It is as if we dismissed all our police, then wanted to kill the watchdogs which keep out the thieves.

Nobody likes a plague of flies. They bring illness into our homes by carrying germs of disease into our food. Hundreds of birds help to keep down the numbers, yet among the thoughtless they have few friends.

BIRDS WHICH HELP TO GUARD OUR HEALTH AND OUR CROPS

We have, as summer visitors, several species of birds, the flycatchers, which live entirely upon these little winged pests. The phœbe flycatcher is quite a common bird in places where men have much thought or few guns. It goes only to places where flies are most numerous, and is worth its weight in gold. The least flycatcher comes too, but not in such numbers as the other. Both ought to be carefully protected.

The nuthatch is another bird which the thoughtless would destroy, because it gets nuts. But nuts are not ripe until autumn, and the bird has been earning its wages all the spring and summer by picking off the insects and grubs with which the nut-trees are infested. The nut-trees of Kent would be better and more sound if the number of nuthatches were largely increased in that county. There is another excellent worker for our good in the wagtail, that jolly little bird which so swaggeringly flirts his tail as he runs across the lawn looking for insects, or hops gaily about the side of the pond. He is an insect eater, and no one should harm him.

THE CRUELTY AND STUPIDITY OF MEN WHO SLAY THE BIRDS

We have too few birds in America to wish to sacrifice any of them. Insect pests abound with us; flowers, fruit, and vegetables are ruined every summer's day by them. That shows that there is still work for the birds to do. Remove the birds which help us, and there will come such a plague upon our land as we can only picture from the story of Pharaoh's dreadful lot. Nature's laws are for ever. A man's life and experience are so short that he should not in his brief day attempt to sweep away his excellent little servants because they take something which is of value to him. After all, they honestly earn the grain and fruit that they take.

THE STORIES OF BIRDS END HERE; THE STORIES OF FISHES BEGIN ON PAGE 2335

THE MOON, THE LAMP OF NIGHT

CONTINUED FROM 2088

FOR many millions of years past, certainly not less than fifty millions, the earth has been attended by a *satellite*—which means attendant—called the moon. In all ages men have admired the moon, and in the history of almost all nations there are records that the moon has actually been worshipped. It is, of course, the most brilliant body in the whole heavens, after the sun, so far as our view of things is concerned; and, just as the sun is the king of day, so the moon is the queen of night, and on account of her beauty has been celebrated by thousands of poets. The whiteness of the moon's light has always been for poets an emblem of purity, though this light, as we know, is not made by the moon, but is merely reflected sunlight.

The time has gone when men thought that everything in the world existed only for their use, nor do we now credit the moon with the power of causing lunacy, which really means *moon*-acy. But we know that the moon has very important influences upon the earth. The most obvious of these influences is the light which the moon sends us, which at night may sometimes be quite useful. We have already seen how little of the sun's light the earth catches, and the moon, being smaller than the earth, catches much less. It has been reckoned that it would require 600,000 full moons, all shining together, to light the earth as brilliantly as the sun lights it now. The sun is always shining, and the side of the moon which is exposed to it is always lit by it, except for a few minutes now and again, when the earth gets between the sun and the moon. The proof of the fact that the moon gives out no light of its own is to be found in the changes that the moon goes through every month. These changes, which we are all more or less familiar with, can only have one meaning—which is, that all the light we see the moon by is reflected sunlight; and if the sun's light upon the moon is lighting the half which is away from our eyes, then we see no moon at all.

The only exception to this is that sometimes we can see what people call "the old moon in the young moon's arms." We see, perhaps, a beautiful bright crescent, and then the rest of the moon very faintly shown. The bright crescent we see by reflected sunlight, and the rest of the moon's face by reflected earth-light. This is one of the facts which prove that the earth, seen from somewhere else, would look bright. It reflects sunlight enough, indeed, to light up the face of the moon at times sufficiently for us to see it by.

The brightness of the moon depends on its nearness. In all the heavens there are only a very few bodies that we can see smaller than the moon, but the moon has the great advantage of being very much nearer us than anything else. Its distance

from the earth is only about 240,000 miles—less than ten times the distance round the earth. Compared with the distance of the sun or of Mars, this is, of course, very small indeed. It gives us the great advantage that we can study the moon with our telescopes more closely than any other body in the heavens.

WHY THE MOON COOLED DOWN AND DIED SO QUICKLY

The moon, however, is very tiny, and the whole face of it, which we see, is only about twice the size of Europe. If you look at Europe on the map of the earth, you will see that that does not amount to much. The distance through the moon, or its diameter, is only a little more than a quarter that of the earth, and "if the earth were cut into fifty pieces, all equally large, then one of these pieces rolled into a globe would equal the size of the moon." But the surface of the moon is about one-thirteenth that of the earth. These figures are extremely important and interesting. They show us that when the moon is compared with the earth, it has a far bigger surface in proportion to its size. It is only one-fiftieth of the size, but instead of having a surface only one-fiftieth the size of the earth's, its surface is one-thirteenth that of the earth. That is why the moon has cooled so very much more quickly than the earth has done, and this rapid cooling of the moon accounts for two things: first, its cold and lifeless state to-day; and second, the character of the moon's surface, which shows that its life, so to speak, was "a short and merry one." The cooling crust of the moon shrank down upon its interior so quickly that the most violent things happened, the marks of which have been left long ages afterwards on the surface of the moon for us to study.

THE SIDE OF THE MOON THAT MEN HAVE NEVER SEEN

The fact that the distance across the moon looks to us always much the same shows that the moon's distance from the earth varies very little, and that is so. The reason is, of course, that the moon travels round the earth in a path which is very nearly, but not quite, a circle. It moves once round the earth in about twenty-seven days and a third. This time makes the real month, which we call the lunar month. There are twelve months in the year according to the calendar, but that has only been made so for convenience. Really there are thirteen and a little bit more; in other words, while the earth goes round the sun once, the moon goes round the earth a little over thirteen times.

But, as the moon goes round the earth, we find that she keeps the same side towards us. Indeed, we have never seen, and never can see, more than one half of the moon's surface, or just a trifle more than half. The reason is that the moon is slowly spinning upon itself as it moves round the earth, and it makes one complete spin on itself in just the same time as it takes to go once round the earth. In other words, the moon's 24-hour day is a month long.

Anyone living upon the moon, then, would have day and night as we have day and night upon the earth, and for the same reason—because the moon is spinning. But, as the moon's spin is very slow, the bright part of his day would last about one of our fortnights, and the dark part of it, corresponding to our night, would last another fortnight.

A WORLD THAT WE KNOW BETTER THAN WE KNOW AFRICA

Of course, we should like to see the other side of the moon, but we may be quite sure that if we could it would be very much the same as the side we can see. We have now mapped out the visible half of the moon very carefully with drawings and photographs. As Sir Robert Ball has said, "astronomers know the surface of the moon better than geographers know the interior of Africa. Every spot on the face of the moon which is as large as an English parish has been mapped, and all the more important objects have been named." This, we must remember, however, applies only to one-half of the moon's surface. Of the other we know nothing. When we look at a map of the moon, or when we look at the moon through a telescope, we do not see at all anything like the face we all know so well, but we see at once what it was that made the appearance of a face.

The moon's surface is richly covered with markings, the largest of which are great dark spaces, which are the markings we see with our naked eyes. These spaces, though they contain no water, were called "seas" by the old

LOOKING AT ANOTHER WORLD

Of all the worlds in the sky, the moon is the nearest to us. It is only 240,000 miles away, and when we look at it through a huge telescope such as this, the moon seems to come down quite close and appear as near as does the small section in this picture. So large is the moon through a big telescope that we can study only a small part at a time, and we are able to make a more complete map of the moon than we can of some parts of the earth.

astronomers. We also see great ridges, which are mountain ranges, and large rings, which are the remains of volcanoes.

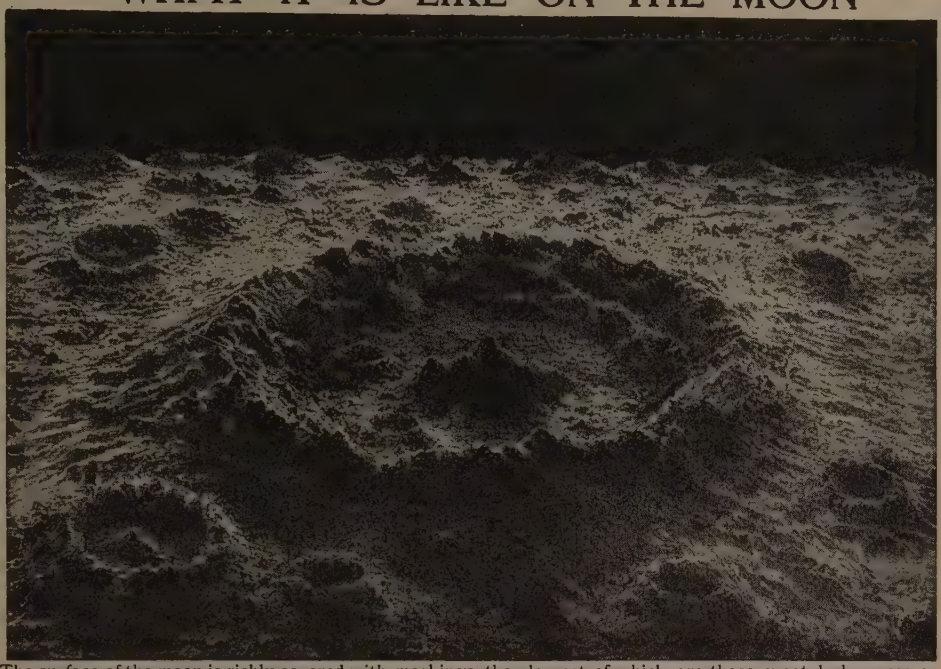
There can be no question that many of the things we see project from the surface of the moon, and that they are lit from something outside them, for we can see their great shadows. When the moon is quite full, and the sun is striking directly upon it, these shadows are absent, and, indeed, though the moon is then beautiful to the naked eye, the astronomer cannot learn from it nearly so much as he can at other times. If we want to see a lunar mountain at its best, we must watch it when it is not far from the edge between light and darkness. The sun's rays are then falling upon it slantwise, and we can see its form, the shadows it throws, and learn from them the size of it.

The shadows thrown by the mountains of the moon are extremely brilliant and sharp. The reason is that the moon has no air. The shadows thrown on the earth are neither so black nor so sharp as they would be if there were no air, for the air spreads the light about, and throws a certain amount even upon the blackest part of the blackest shadow. Now, it is not difficult in the case of the earth to find out how high a thing is if we can measure the length of its shadow. We should do this at noonday, when the sun is highest in the sky, and then, if we

A PICTURE-MAP OF THE MOON: A DEAD WORLD LIT UP BY THE SUN

This is a picture-map of the moon, which is really a dead world, as the earth would be if there were not one living thing upon it. The moon travels round the earth as the earth travels round the sun. It is not light in itself; what we see is the light of the sun upon it, as we see the light of a candle thrown upon a wall. We see really one half of an enormous globe, like a small earth, lit up in the sunshine, spinning in space like a fireball, yet weighing millions of tons. The little map shows how much bigger than Great Britain the moon is.

WHAT IT IS LIKE ON THE MOON



The surface of the moon is richly covered with markings, the clearest of which are those great dark spaces or plains which we can see with our naked eyes. Through a telescope, however, we can see the great mountain ranges and large craters of extinct volcanoes like those shown in this picture, which is a photograph of a model made by a great astronomer to show what the surface of the moon is like. These mountains are more lasting than those on our earth, as there is no rain or wind to wear them away in the way that they do on our earth.

This is a photograph of the part of the moon in the neighbourhood of the volcano called Plato. The dark oval is the crater of this mountain, and measures at its widest not more than fifty miles across The walls of this crater, the black shadows of which can be seen on the left of the oval, are in some parts as high as 8,000 feet. At the top of this view on the left we can see a groove or valley supposed by some to have been cut by a huge aerolite passing over the surface, and by others to have been made by an earthquake ages ago.

know how high the sun was on the day in question, we can calculate from the length of the shadow what the height of the object is. Indeed, if we make the measurement on certain days in the year, the length of the shadow is the same as the height of the thing we are measuring. It is not a very difficult matter to find out the number of miles that a shadow on the moon extends, and we can also find out how high the sun would appear to anyone looking at it from that part of the moon. So we can measure the height of mountain peaks and of crater edges in the moon. We find craters fifty, sixty, and more miles wide. Some of these have walls of the most tremendous height—10,000 feet, for instance. In other places, instead of a deep crater, we find a great plain, perhaps with a mountain peak in its centre, perhaps not. One of the most splendid of these craters is named after Copernicus, and many other astronomers have had their names given to the larger craters that scar the surface of the moon.

THINGS THAT HAPPENED BEFORE THERE WERE HUMAN BEINGS ON THE EARTH

According to many astronomers, there are still occasional traces of things going on upon the moon. For instance, we believe that a small crater has been found that was not there before. However, even if there were no doubt that small changes still occur on the surface of the moon, we are certain that nothing which now occurs there can compare for a moment with the tremendous events which created the moon's surface as we now see it. So far as we can judge, these events must have occurred not merely long before there were any human beings upon the earth to witness them, but at a time when the earth was so hot that no life of any kind upon its surface had yet become possible.

In any case, the facts of the moon's surface clearly show quite what we should expect when we remember how quickly a small body cools compared with a large one. There is one crater upon the moon which is all but eighty miles across, and the moon's craters and mountains are not to be found here and there merely, but cover it almost everywhere. Indeed, we require some other explanation of the reason why such tremendous heapings up of matter have been possible upon the moon, and that explanation is again to be found in the moon's small size.

A MAN ON THE MOON COULD JUMP ACROSS THE STREET

The force of gravitation on the moon's surface is very different from the force of gravitation on the earth's surface. It is only one-sixth as great. A man who on the earth can jump six feet high, as some can, could jump thirty-six feet high on the moon. This means that the explosive force of the volcanoes on the moon, hurling upwards all the substances which reached them from the interior of the moon, would be resisted by a feebler force of gravitation, so much less than we are familiar with on the earth that we can begin to understand how some of the great features of the moon's surface can have been formed.

All the features of the moon's surface depend upon volcanic action and the effects of the moon's rapid shrinkage. The case is very different on the earth, where air, wind, and water account between them for a great part of what happens and has happened. Our study of the earth has already shown us how vastly important air and water are in changing its surface. In the case of the moon, there is a world without air and water. Thus, Sir Robert Ball has said:

"It seems probable that a building on the moon would remain for century after century just as it was left by the builders. There need be no glass in the windows, for there is no wind and no rain to keep out. There need not be fireplaces in the rooms, for fuel cannot burn without air. Dwellers in a lunar city would find that no dust could rise, no odours be perceived, no sounds be heard."

WHY THERE ARE NO SUCH CHANGES ON THE MOON AS ON THE EARTH

Air and water, as we know, are always smoothing away the prominences on the earth, rubbing them down and rounding their edges; but when a great mass of lava was thrown up by a volcano on the moon, and hardened as it cooled, it took a shape which ages could not change, for there was nothing to cause the change. There is only one fact about the moon which can contribute much to any changes upon

THE EARTH AS IF SEEN FROM THE MOON

This picture shows us what the earth would look like if we could see it from the moon. The light of the sun falling upon the earth must make it shine like the moon when seen, if it is seen, from other planets. We do not know if there are any inhabitants of the universe who see our earth like this, but if so they must be utterly different from ourselves. No beings dependent upon air for their life could live on the moon, for the moon is an airless world. People on the moon could not speak, because sound does not exist without air; the largest cannon-ball that could be fired, if it could be made to reach the moon, would fall like a pin upon velvet. The moon might be filled with lovely flowers, but they would give off no scent; birds might sing from every branch, but not a note would be heard. For the moon is a silent world, where sound, and speech, and smell cannot exist.

its surface now. As the moon has no blanket of air, it is very much exposed to the rays of the sun. During the moon's day, which is as long as 14 of our days, the surface may become intensely hot, but during the moon's night, which is as long as 14 of our nights, there is nothing to keep in the heat which it has received during the day, so that heat is radiated freely outwards, and the moon must become colder than any part of the earth ever is. So, the surface of the moon must shrink very much with cold and expand with heat each night and day.

WHEN THE EARTH AND THE MOON WERE ONE, AND THE DAY WAS 4 HOURS LONG

We cannot doubt that the matter making the moon was once part of the earth. The proof of this cannot be explained unless we have first made a long study of mathematics. But it has been shown, especially by Sir George Darwin, son of the great Charles Darwin, that the moon must now be getting more distant from the earth, and must have been much nearer the earth once than it is to-day. We shall see, indeed, that the moon, when close to the earth, must have travelled round at the same rate as the earth rotated on herself. The earth's day was then four hours, and the month would be the same, because, of course, the month is made by the time the moon takes to go round the earth. This means that the earth and the moon moved together as if there were a bar between them, or as if they were one body, as they must once have been. Of course, we are thinking of an earth very different from the earth of to-day—certainly an earth with a liquid surface. On such an earth tides must have been caused by the sun, as it rotated at this great speed of once round in four hours, and if a great tidal wave of liquid earth were thrown off, as a drop may be thrown from a twisting umbrella, that might account for the origin of the moon.

THE PATH OF THE MOON ROUND THE EARTH

That is all we can say now about this very difficult but very interesting question. If it were true that this was the origin of the moon, we should expect to find the moon spinning upon itself and revolving round the earth, in the same direction as the earth spins round itself and revolves round the sun; and so we do. But the path of the moon round the earth is not quite on the same level, or in the same plane, as astronomers say, as the path of the earth round the sun. In a picture on a flat page—like, for instance, one of the pictures shown here—it looks as if the moon were travelling round the earth on the same level as the earth is travelling round the sun. If this were so, of course we could not see a full moon, for then the earth would be in the way of the sun's light, and instead of a full moon we should have an eclipse of the moon every month. Also the moon would eclipse the sun every month. But if we think of the moon's path round the earth as being tilted a little at an angle to the earth's path round the sun, we shall understand how it is that we are able to see a full moon, and we shall also understand that, at certain regular intervals, when the path in which the moon moves crosses the path in which the earth moves, there may be an eclipse.

WHAT THE EARTH WOULD LOOK LIKE TO A MAN IN THE MOON

If intelligent beings lived upon the moon, our earth would appear to them a most magnificent object, looking in the sky many times larger than the moon does to us, equally bright as a whole, but often hidden partly by clouds, as the moon never is. This large earth would eclipse the sun, but the size of the earth as seen from the moon would be very much larger than that of the sun, and so an eclipse of the sun by the earth, as seen from the moon, would blot out not only the body of the sun, but also its prominences and the corona, and would only leave all round a faint glow of light.

Astronomers could not learn nearly so much about the sun from the moon's surface as we can from the earth's surface, as the apparent size of the moon seen from the earth is just right for the astronomer's purpose. The relative distances of the moon and the sun vary a little at different eclipses. Sometimes the disc of the moon is a little too small to blot out the whole of the body of the sun, and then we can see a ring of sunlight all round the edge of the moon.

The next part of this is on page 2279.

WHY DOES A POP-GUN GO POP?

CONTINUED FROM 2080

THE "pop" of a pop-gun is, of course, a sound, and all sounds are waves of a particular kind produced in air or in other things. If they are to be what we call sounds they must be the kind of waves that our ears are able to hear, and these are special, differing from waves of wind, because they are very short and quick.

The question, then, really is: How does the pop-gun cause the kind of air-waves that we can hear? And the answer is that air inside the gun is compressed and then suddenly released, when the gun goes off. As it is released, it naturally expands or spreads itself out again to fill the space it filled before it was compressed. This means, of course, that it gives a quick push, as it expands, to the air on all sides of it, and so it starts the wave of air, which spreads out in all directions from the point where it started, and reaches our ears. The kind of wave is one which our ears hear as a very short, sharp sound. It is short because the cause of it acts for only a very short time, and the sound of it is best represented by the word "pop."

IS THE WORD POP AN EXPLOSION?

Pop is one of the many words which were invented in imitation of sounds. We use the word "explosion" to indicate the kind of sound that is made in a case like this, when a gas suddenly expands from a smaller to a larger space, and so causes a wave in the air.

Now, if we notice what we do when we make the letters p and b, we shall find the reason why students of letters call these the explosive consonants. They are both produced by explosions, and if you say *both produced* or *biped*, you will notice that the explosion is rather less for b and rather more for p; that is all the difference between them. But the present question is whether we are strictly right in calling p and b explosives. The answer is "Yes," for in making these consonants we actually make little explosions; we do exactly the same as when we fire a pop-gun. We squeeze or compress the air in our mouths, and when we have done that we allow it to force itself through between our lips, which we began by closing. Try to say p or b with your mouth open!

Then the compressed air escapes explosively, as in the pop-gun when the cork flies out, and starts a wave in the air which we call p or b, according to the suddenness with which the air escaped. A p may be soft or a b loud, but that depends on what happens in the voice-box. The difference between the two, whether

loud or soft, depends only on the suddenness of the explosion. So we learn that these consonants are called explosives not merely because they are like the sounds of little explosions, but because they *are* the sounds of little explosions.

WHAT MAKES THE LOUD NOISE WHEN A GUN IS FIRED?

This noise also is due to an explosion, the sudden expansion of a compressed gas, as it escapes into the air from the space in which it was confined. Now, in a pop-gun, or in the case of the explosion that forms the letter p, the gas that is compressed and then allowed to expand is air which already exists as air. But there is no air or any other gas in a cartridge, and the question is: Where does the gas come from that makes the noise and fires the bullet when a gun is fired—just as you may fire a drop of saliva from your mouth sometimes when you say p very forcibly?

What happens is that we suddenly burn a powder which we have prepared of materials such that when they are burnt a large quantity of gas will be produced, and it must be produced very suddenly, if the full explosive power is to be obtained. We have another great advantage in trying to make this kind of explosion, as we have not when we fire a pop-gun or say p. That is that the gases produced are exceedingly hot, for they are heated by the burning which makes them. A hot gas naturally occupies a great deal of space—far more than a cold gas, and so when we fire a gun we suddenly produce a great quantity of very hot gas in a very tiny space, which is not nearly sufficient to hold it. If this were done in a closed box it would burst the box, but in the case of the gun we have prepared a way out for it—only that we put a bullet in the way. Out comes the gas, driving the bullet before it, and as it expands it starts the wave of sound we hear.

WHAT IS GUNPOWDER MADE OF?

Modern gunpowders are very different in many ways from the old gunpowder that was used for so many years without any change. Nowadays we make smokeless powders and all sorts of "high explosives," as they are called, which are very different in composition from ordinary gunpowder. But in all cases the principle is the same. It would not do to admit air to the powder, because we should require a channel for the air, and the explosion would occur through that channel. Also, air is only one-fifth oxygen, and the nitrogen would be of no use. We must have our oxygen *in* the powder. That is done by using such a thing as saltpetre or nitre, which has a great deal of oxygen in it. Just as chalk has oxygen in it, so has nitre, and it has the advantage that it very readily gives off its oxygen to anything that will take it.

Also when nitre is decomposed the nitrogen in it gets free, and this nitrogen, besides requiring room for itself in any case, is made very hot by the burning that has occurred, and so requires much more room than it would if it were cool. Next, we must have something to burn, and that is supplied by charcoal, which is carbon, and by sulphur or "brimstone." These take the oxygen from the nitre very quickly, especially as the oxygen given off from one of its compounds is specially active in combining with other things, as we have seen in another part of this book.

Thus the gases which cause the explosion when they expand are carbonic acid, sulphur dioxide, and nitrogen, together with small quantities of other gases, while the potassium, of the nitre is left, combined with other things, and forms what must be cleaned out often if the gun is to work well. The invention of this mixture—carbon, sulphur, and nitre, called gunpowder, was a great event in the history of war, which it completely changed.

WHAT IS SMOKE MADE OF?

There are many different kinds of smoke. The gases that are produced when a gun is fired are not smoke, for smoke is never a gas, but a mixture of finely divided *solid* matter suspended in air. In the case of ordinary gunpowder we get least smoke when the proportions of the various things in the gunpowder are nicely balanced. If there is too much of anything in proportion to the others it will not be used up, but will be driven out as smoke; and in any case there is some smoke with ordinary gunpowder, which is by no means the best mixture that can be obtained for the purpose.

The smoke of towns is mainly made of particles of carbon, but a special objection to it is that it is oily, and so

sticks to things and catches dirt. The exact composition of smoke depends, of course, on what is burnt, and on how it is burnt. The smoke from a wood fire is very different from that of a coal fire; and in either case the amount and the composition of the smoke largely depend on the temperature of the fire.

The hotter the fire the better and more complete will be the burning or combustion of the fuel. We have all noticed how, when a fire has just been lit, and so is not yet very hot, dense clouds of smoke arise from it; but when the fire is well going, and burns hot and clearly, it produces very little smoke. Also, much less smoke is formed from certain kinds of coal than from others, and much depends on the supply of air to the fire. All these points are very important on account of economy of fuel, the heat produced by the fire, and the injury which smoke in the air does to human beings as well as to all animals and plants that have to breathe it.

WHICH IS THE MOTHER—THE HEN THAT LAYS THE EGG, OR THE HEN THAT HATCHES IT?

You might almost as well ask which is the mother, the woman who gave birth to the baby, or the fire that keeps it warm, or the cow that gives it milk when its mother cannot? And yet the question is well worth asking and answering, for there are two parts to being a complete mother. One is bodily, or physical, and is, of course, the *real* motherhood. It is the real motherhood, for the chick that develops from the egg really gets its life from the hen that laid the egg, as does the baby from its real mother. Both egg and baby require more "mothering" of a kind, and that is why we may say that *complete* motherhood has two parts; but we see which part is more important, when we remember that it is quite easy to hatch a hen's egg by putting it in a box that is kept warm. This is called an incubator, and so your question might almost run: Which is the mother, the hen that lays the egg, or the warm box that hatches it?

Among human beings the second part of motherhood, though not the real and bodily part, is more important than among any other creatures; for babies are more helpless, and are longer helpless, than any other young creatures, and so need more care. So we must say that though the real mother is she who gave birth to the baby, yet we can call her a complete mother only if she cares for the baby after it is born; just as the hen who lays the egg and then takes care of it, and of the chick afterwards, is a more complete mother than the hen which only lays the egg and then does nothing more for the young and needy life that is within it.

IS THE EARTH HOLLOW INSIDE?

Though no one has ever seen, or ever can see, the inside of the earth, we are perfectly certain that the answer to this question is "No." We know that the earth has a solid crust, very thin, and very apt to crack and "buckle," producing such things as mountain chains in consequence, and we can prove that this crust must be utterly different from what lies underneath it. Now, one of the many ways in which we can learn about the inside of the earth is by weighing the earth, and noting its weight in comparison with its size. This teaches us what the density or denseness is of the stuff that makes the earth, and the result is a conclusive answer to the question.

If you had given you a small ball which weighed tremendously heavy—far heavier in proportion to its size than any ball you play with—you would not suspect it of being hollow, but rather you would wonder how it came to be so tightly packed and squeezed together. That is the case with the ball we call the earth. Its denseness is very high indeed, and the material in it is packed and squeezed together with more tightness than we can imagine. We have just scratched the surface of the earth, we human beings, and already, in going down even such a tiny distance, we find the density increasing, as it must, if we think of the weight that lies over us at the bottom of a mine. Certainly, then, the earth is not hollow inside, but really the very opposite of hollow!

ARE OUR BODIES HOLLOW INSIDE?

The answer to this question really goes with the answer to the last, and, for the same reason as in the last case, the answer is "No." The pressure to which the inside of the earth is subjected prevents it from being hollow, and the pressure to which the inside of the body is subjected prevents it from being hollow. We know that there are tubes

in the body, and bags, such as the stomach; and everyone is apt to think of the stomach before a meal, when we say we feel "empty," as if it were a bag with a hollow space inside it.

But it is never anything of the sort. The whole body is subjected to the pressure of the atmosphere, squeezing it on all sides, and the consequence is that when the stomach, for instance, is empty, its walls are always squeezed firmly against one another by everything that is in their neighbourhood. The whole body and all the organs in it, whether solid or hollow, are packed tightly together, with never a chink or a gap or an empty place anywhere. It used to be said long ago that "Nature abhors a vacuum"—*vacuum* is Latin for an empty place—and this means that there are really no empty places anywhere, for Nature always fills from without any space or place that we try to make empty. This applies to the earth or the air or the sea or our own bodies; and even when we make what we call a vacuum by scientific means, it is really crammed full with the ether, which is absolutely everywhere, even in what we call empty space.

WHAT KEEPS TRAINS ON A TOPSY-TURVY RAILWAY WHEN UPSIDE DOWN?

Of course, the puzzle is that when the train is upside down there seems to be nothing to act against the force of the earth's attraction, which is always pulling on it. Now, the train does not fall, and we are certain that gravitation is always acting, and *must* pull the train straight back to the earth if nothing acts against it. There, therefore, must be some other force acting which is powerful enough to act against gravitation so as to keep the train on the rails.

Exactly the same thing is seen when we swing a pitcherful of water round on a chain, without spilling the water. What keeps the train on the rails, or the water in the pitcher? Now, we know that if the train stopped moving when it was upside down, or if the pitcher was similarly stopped, train or water would fall. Therefore the force we are looking for, that balances the force of gravitation, must be somehow *in the motion* of the train or the water.

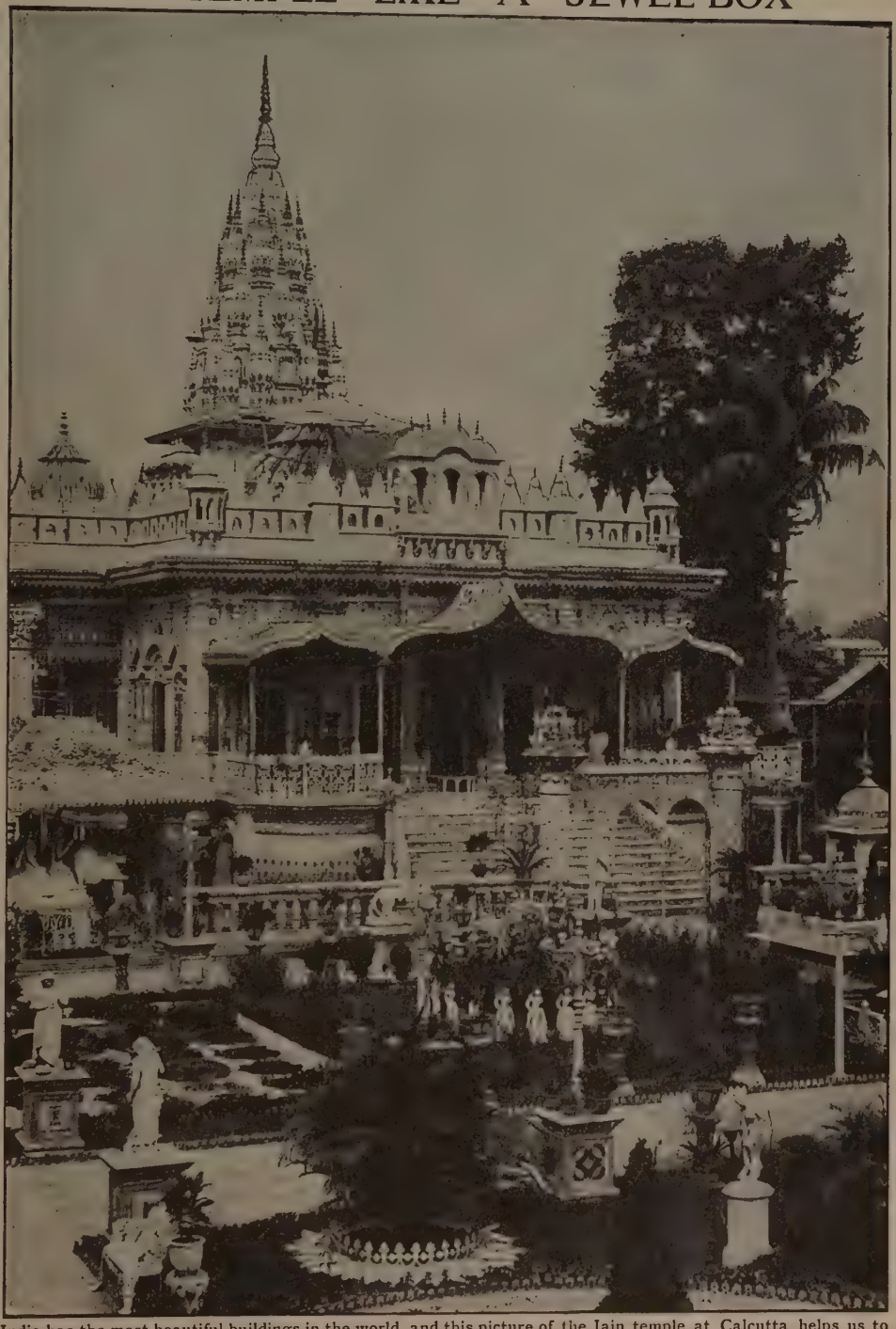
And so it is. Anything in motion has force in it, as we know when someone bumps up against us. Now, this force acts in the line in which the thing is moving. But when a thing moves round and round, this force is still working in a straight line, so that the thing always tends to fly away from the circle in which it moves. This force has the rather hard name of *centrifugal* force, which means the force that flies away from the centre of the path in which the thing moves. It is this centrifugal force, produced by its motion, that always presses the train against the rails in any part of its course, or the water against the pitcher. It is this force also that keeps the earth from falling into the sun; and if train, or water, or earth were stopped in its course, or did not go round quickly enough, each would certainly fall—to the ground in the first two cases, and to the sun in the last case, and all for the same reason. These great laws act in big and little things alike: "The law that moulds a planet rounds a tear."

WHY DO HOUSES SEEM CROOKED WHEN WE LOOK ABOVE A STREET FIRE?

Light is always bent in some degree by the various things through which it passes—as when it passes through the air to our eyes from a star, or as when a stick, half in water, seems to be bent. Now, so far as light is concerned, the air is different according to its warmth. Warm air is less dense than cold air, and when light passes from one to the other, in either direction, its path is more or less bent. So when we look at the houses through the hot gases that rise from a watch-fire, the light, as it travels from the houses to our eyes, is bent in passing from the cold air through the hot gases, and is bent a second time in passing from the hot gases through the cold air again.

Also, as the fire does not give off the same quantity of gas at every moment, the light is bent in different ways, and not only do we see the houses crooked, but they seem more or less crooked as we keep on looking at them. This bending, or breaking, of the rays of light as they pass from one thing to another is called *refraction*, which simply means breaking, and is very important in every way. Just as you see the houses crooked when you look at them through the gases from a fire, so we see all the stars crooked when we look at them through the air. The

A TEMPLE LIKE A JEWEL-BOX



India has the most beautiful buildings in the world, and this picture of the Jain temple at Calcutta helps us to realise something of the great wonder of this ancient empire. The temple is built chiefly of white marble, and every square foot of the surface is decorated as if it were a jewel-box. The posts of the gateway, the wall-spaces, and the front are covered with mosaic made of millions of square pieces of marble and glass; and this glass reflects the light, so that when the sun is shining upon it the temple seems to be covered with diamonds.

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light from the stars is bent as it passes through the air, and so we do not see stars where they really are, but always a little distance from the real place, because of the *refraction* of their light.

WHAT IS IT THAT CAUSES AN EARTHQUAKE?

The first reason that probably accounts for all earthquakes is simply that the earth is shrinking as it gradually loses the heat from its surface. We know that the earth has a very thin crust, which is comparatively cool, and a very hot inside. The crust rests upon the inside of the earth, and as the inside shrinks it is bound to leave parts of the crust unsupported, so that they are apt to sink or crack. This will happen especially where the crust of the earth is thinner and more liable to crack than in other places. It is very common in Japan, for instance, and very rare in England.

But when an earthquake happens at any part of the earth, it starts a wave of disturbance that travels right over the earth, and can be detected anywhere if we look out for it. Then, if we notice the time when the wave reached a place, and find out what the time was when it started, we can learn how quickly the earth-wave travels. But sometimes no one knows where the wave started, and then, very often, we can guess that it started under the sea; for earthquakes may start in the earth's crust where it forms the beds of great oceans as well as anywhere else. And so there may ever be earthquakes at the bottom of the sea,

WHY DO WE SHIVER WHEN WE ARE VERY COLD?

There are more good reasons than one why we shiver when we are cold. The machinery of it, as we may say, is that cold, *at first*, rather excites and disturbs the nervous system, just as heat usually soothes it. We notice these contrary effects of heat and cold in the case of a warm bath and a cold dip. This, of course, is not to say that shivering is at all the same thing as the feeling of activity we have after a cold dip; but in each case the cold has been what is called a stimulant. But now we have to ask whether the shivering is of any use to us, or whether it is a wholly useless and purposeless thing; beyond any doubt it is possible to show that shivering serves the purposes of the body just as hunger does, and just as even fever often does, though we think of these as things rather bad in themselves. One good reason for shivering is that it makes us aware of cold as we might not otherwise be, and so we can protect ourselves. After the first stage of its action great cold sends the brain to sleep. Shivering perhaps serves to keep the brain awake and make it aware that something must be done.

DOES SHIVERING FROM COLD HELP TO MAKE US WARM?

I think that a very good reason for shivering can be found. Whenever a muscle works, heat is produced; indeed, a very great part of the heat of the body is made in the muscles, which have been called "the fireplaces of the body." Shivering consists of small, quick, to-and-fro movements, sometimes almost quite regular, as when our "teeth chatter," of most or all of the muscles of the body. Now, though shivering often makes us aware that we are cold, yet it really helps to keep us warm, for all these little muscular movements are producing heat. So we may say that when a person, by keeping still, refuses to work his muscles so as to keep warm, the brain takes the matter into its own hands and does what little it can, in spite of him, by setting his muscles shivering.

WHY DOES EVERYTHING SPIN ROUND WHEN WE ARE DIZZY?

When anyone feels dizzy, and perhaps almost about to faint, his brain cannot properly control the working of his eyes. They may move round from side to side, perhaps independently instead of together, and so it may look as if things were spinning round. Another reason for dizziness has to do with a wonderful part of the body near the ear, and without which none of us could sit upright, much less stand, though few people have ever heard of it. This organ, which used to be thought to have something to do with hearing, really controls our balance. In some people it suffers from a disease, and these people constantly suffer from dizziness and a feeling that everything is spinning round and round.

As every child knows, we can make ourselves dizzy, and can think that

everything is spinning round, by turning round ourselves several times in one direction. This disturbs the organ of balancing, about which we have been speaking, and this disturbance it is that gives us the feeling. If you turn round the other way you put things right, by restoring the original state of affairs within the balancing organ. The name for the feeling that things are spinning round is *vertigo*; and *vert* simply means *turn*, as in such words as convert, invert, and others.

WHY IS IT THAT FLAMES NEVER GO DOWN, BUT UP?

We might think, if we had not noticed, that this question was not true, and that flames only go upwards because a gas-jet, for instance, is always directed upwards. But the question is quite true, even in the case of a gas-jet that is directed downwards, for we find that then the flame turns upwards. If we *must* have a flame going downwards or sideways, then we must have a draught to blow it, just as the wind will blow the flame of a match in any direction. This can be done in certain burners by turning the hole where the gas comes in the direction we want, and by making the gas come out very fast. Also, in the case of a fire, there is a considerable draught of air up the chimney, helping to blow the flames up with it.

But even where there is no draught at all in any direction, and when we burn something without sending any gas in any particular direction through a hole, flames always go up, and never down, as the question says. And the reasons are: First, that the gases made in the flame are very hot, and, as hot gases are always much lighter than the cold gases that make up the air around them, the hot gases of the flame tend to rise; and secondly, every flame, as the hot gases go upwards because they are so light, *makes a draught for itself*. As the hot gases go up, the space they leave is filled from below, and this goes steadily on, and so makes a draught.

IS THERE ANY USE IN THE WAY HOT GASES RISE?

A gas-jet, properly used, may actually help to ventilate a room by making a draught; and every fire does the same thing, by increasing the natural draught going up the chimney. If hot gases did not rise, I do not see how we should live, nor how anything—a fire, or a gas-jet, or anything else—could go on burning for more than a second or two. The gases which are produced when anything burns are themselves burnt, once and for all; they can neither be burnt again, nor can they help to burn anything else. Their life and power, we may say, is ended for ever.

These gases consist chiefly of carbonic acid gas and water-vapour. They are both of them completely oxidised—the carbon of the one and the hydrogen of the other are combined with all the oxygen they can hold. Nor will either of them give up its oxygen for the burning of anything else. Thus, if hot gases did not rise, and so make room for fresh air—which really means fresh oxygen—nothing could burn for long; for nothing can burn in an atmosphere of carbonic acid and water-vapour, and such an atmosphere would at once surround every burning thing if hot gases did not rise.

WHY DOES OUR BREATH RISE IN THE AIR?

Exactly the same is true of breathing as of hot gases, as explained in the last question. If the carbonic acid and water-vapour that leave our lungs hung round the nose and mouth, we should have to breathe them in again at the next breath instead of breathing in fresh air, and so we should certainly be suffocated.

Instead of that, they obey the law of hot gases, and rise out of the way at once, so that when we breathe in again there is fresh oxygen ready for us to use. Of course, we can defeat Nature, if we are so foolish, by cooping ourselves up in close rooms, perhaps with very low ceilings, so that the gases we breathe out can scarcely get away at all from the neighbourhood of our noses, and so we breathe breathed—that is, already burnt—air; and this is one reason why people get sleepy, and even faint, in badly-ventilated places.

We can also defeat Nature—at any rate, to some extent—by other means. For instance, we can put the bed next a wall, which hinders the gases of breathed air from getting freely away. Beds should, if possible, be away from a wall. If not, they should be placed so that the wall is not on the side that the sleeper usually sleeps on.

And the question about the bed-clothes suggests a way in which we can interfere with our breathing—a way which children especially are rather fond of, as sometimes they feel safer in bed in the dark if their ears are covered.

IS IT GOOD TO SLEEP WITH THE BED-CLOTHES OVER THE FACE?

Mothers and nurses sometimes get anxious about this, for they think—and quite rightly, too—that a child, or anyone else, should have its nose free when it is asleep, and not covered with the bed-clothes. But if they will watch a sleeping child, they will see that though often the child starts to go to sleep by covering its face up, yet *always*, when it is asleep or nearly asleep, the child's body will do the rest for itself, and the head will be moved until the nose gets free of the clothes, so that fresh air can get to it, and so that the breathed gases can freely rise and get out of the way. So people who look after children really need not worry if children like to start the night with the bed-clothes almost over their faces. The child's brain, so soon as the child's self is asleep and cannot interfere with it in any way, will put things right.

It may be, too, that we get to sleep more easily by having the nose and mouth rather covered at first. The way in which birds and other animals go to sleep suggests this, and we can understand it at once if we remember that carbonic acid always makes people rather sleepy, as we all notice in badly-ventilated places, such as churches and halls and crowded rooms, and almost anywhere except the open air, or a room with open windows.

HOW DO WE KNOW THE NAMES OF OTHER PLANETS?

This is what a boy would call a "jolly" question, said the Wise Man, and I should like to go for a picnic with the boy or girl who asked it. The name of everything is something that men have given it, or else that children have given, like the names "mamma" and "dadda," which babies invented. So when we talk about *knowing* the name of anything, we really mean only knowing what some other people have chosen to call it. The name is not a natural part of the thing; the name does not matter so long as other people know what we are talking about. "A rose by any other name would smell as sweet," said Shakespeare. And the sun by any other name would shine as bright and, of course, would still be just as much the sun as ever. Indeed, before we talk about the planets, what about the name of the sun itself? We call that great bright thing "Sun," but the Romans called it Sol, and the Greeks called it Helios. If there are people on Mars they may call the sun "cat," and if they have cats they may call them "suns," for all we know, and for all it would really matter. A name is just a label.

HOW DID THE PLANETS GET THEIR NAMES?

The names of most of the planets are very old indeed, and they were given to them for interesting reasons worth knowing. Mercury moves very quickly, it has to, for it is so near the sun that it would be drawn in unless it moved quickly, and its name—Mercury—is after the "messenger of the gods," whom the Greeks and Romans invented and believed in. Then Venus is very beautiful and gets its name from Venus, the supposed goddess of beauty. Mars is reddish and so suggests blood, and was therefore called Mars, after the god of war. Jupiter is the biggest of the planets, and is called after Jupiter or Jove, the greatest of the gods whom people believed in long ago.

Then, to take one more instance of the way in which the planets are named, there is Uranus, now so named, like the others, after an ancient god. It was discovered by a great German, William Herschell, who lived in England, and he wanted to call it Georgium, after the King of England. Others wanted to call it Herschell, after the discoverer, which would certainly have been wiser than to name it after a king who had nothing at all to do with it; but finally it was agreed to give it an old name like the others.

As for Earth, the good mother of us all, the ancients called her *Ge*, and so now we call the study of the earth *ge*-ology; while what we call the moon they called Luna. Hence, we have the word lunatic, because in ignorant times it was thought that when a man's mind went out of order, it was through the influence of the moon.

WHO GAVE THE STARS THEIR NAMES?

Nowadays we know an enormous number of stars—about 100,000,000—and the smaller ones (or rather the fainter ones, for they may only seem small because they are distant) simply get numbers or letters, for all the world like motor-cars, in order to identify them. But the brightest stars have been known for many ages, certainly not less than 10,000 years, and the origin of their names is lost, like the names of the men who named them.

Some of these names we call Latin and Greek and Arabic, but certainly many of them are far older than the Romans or the Greeks or the Arabian astronomers, and they got the names from those who went before them, just as we have got the names from them. A star with a specially interesting name is the Pole Star, shown on another page, giving us the direction of the north. No one can say how many millions and millions of sailors' eyes, throughout thousands of past years, have been gratefully and often anxiously fixed upon that star, by which they could steer their way home across the pathless sea. But for all those sailors that star has doubtless been known by whatever word stood for north, in whatever language the sailors spoke. The names of great stars like Aldebaran and Sirius must be older than any human record. *Al* is simply Arabic for *the*, and many of our words and names beginning with al are of Arabic origin.

DO PEOPLE RISE FROM THE WATER THREE TIMES BEFORE THEY DROWN?

The answer to this question is "No," and the old story that drowning men rise three times is entirely erroneous.

Sometimes people who drown do not rise at all—as, for instance, sometimes when they strike their heads against something hard at the bottom. Usually they do rise, for our bodies are only very slightly heavier than water, and the movements of arms and legs, even of a person who is not a swimmer, will raise his body to the surface until he takes in so much water into his stomach and lungs that his body gets heavier and can rise no more. It is entirely a matter of chance how often, if at all, a drowning person rises. During a diving competition at the Franco-British Exhibition in London, in 1908, a diver hit the water flat so that he was "winded." He simply lay at the bottom, for he was unconscious and could make no movements. If everyone had waited for him to come up even once, he would have been drowned, but a swimmer dived in and brought him up, and he was soon all right. Here is a case which shows us that it is never, *never* safe to believe in lies of any kind, however old or popular or pleasant they may be. When anyone is in danger of drowning we must know that it is our duty to act at once, and so we may succeed in saving a human life.

IS EVERY SEVENTH WAVE A BIGGER ONE?

Another superstition we may add to this is one which says that every seventh or every ninth wave, when the tide comes in, is bigger than the others. It is untrue and without any basis of truth. Most of these assertions about three and seven are nonsense, and are derived from long ago, when those numbers were thought to have some special value in Nature.

WHY IS THE STEAM THAT COMES FROM HOT YELLOW WATER NOT YELLOW?

This is a question that goes with those about rain, for the answer to it is the same as the answer to another question—really the same—which might have been asked: Why is rain made from salt water not salt? The answer is that when water turns into a gas or vapour—when it *evaporates*, as we say—it always leaves behind it anything that may have been dissolved in it.

In the case of the rain, the sun makes the water evaporate, but leaves behind the salt that was dissolved in it. In the case of the hot yellow water, the yellow stuff is left behind as the water turns to steam. This rule about water is of the greatest importance in Nature, for it means that, by evaporation, we are always getting fresh supplies of pure water that has nothing dissolved in it, and is therefore able to dissolve new things. We know that much of the work water does in the world is done by its dissolving things, but there is a limit to the amount of anything that even water can dissolve, as you can prove for yourself with a little water and a lot of salt or sugar. If water did not always tend to evaporate and leave the dissolved things behind it, its work of ever dissolving new things would

soon come to an end. And chemists would not know how to get pure water, except by the very long and costly method of actually making it by burning hydrogen with oxygen.

WHY DOES COLOURED SOAP MAKE WHITE SOAP-SUDS?

I rather think that this question is not quite true. The first thing to find out is, what are the soap-suds, or lather, made of, and the answer is that, like foam, they are mainly made of bubbles of water. Only the soap makes the water more sticky, so to say, and thus we get bubbles which hold together, and last a long time. If the soap is yellow before it is melted, it is still yellow even when it is melted, and often you will find that the lather of a deeply-coloured soap has a *faint* colour of the same kind. The real question is, Why is the lather so faintly coloured, so *nearly* white? Directly we study soap-bubbles in general, we find the answer to this question. The film of water (and soap) that makes a soap-bubble is extremely thin; indeed, it is one of the thinnest things in the whole world. Now, since it is so thin, the amount of soap and colouring matter in its wall is very small, and that is why its colour shows so little. A single "red" blood-cell is only a faint yellow in colour, but when we see millions of them together they look bright red. So with other things. When light passes through a very thin layer of any coloured thing, or when light is reflected from a very thin layer of such a thing, the colour is only slight, and faint. The white light is only just a little changed.

HOW DOES SOAP TAKE THE DIRT OUT OF THINGS?

The answer to this question has been a great deal argued by chemists, and of course it is a very important thing, for cleanliness is very necessary, and enormous quantities of soap have to be used, and it is well that we should know how soap does its work, so that we can make the soap that works best.

Now, it is fat or oil that especially makes things dirty—everyone knows how oil catches dust and makes a mess on one's hands and clothes. It is the oil that comes out of the skin, especially out of the head, where the hair is, that makes us so quickly dirty; and the same applies to other things. Now, if only we can melt or get rid of the oil on things, we soon make them clean, and the real use of soap is that, somehow, it disposes of oil. It does this, we now know, in at least two ways. Most soaps have in them a great deal of something we call alkali. This alkali simply dissolves the oil that gathers on things, and so it makes them clean. But soap takes the dirt from things in another way, as we know when we use soaps that have no alkali in them at all. It has the power of breaking up oil into a number of very tiny little drops, which are easily washed away, together with all the dirt that the oil has caught and collected.

A collection of very tiny drops of oil, held in some other fluid, is called an *emulsion*. Water alone will not form an emulsion of any oil, because oil and water will not mix. That is the reason why we cannot wash well with water alone. But when water has soap dissolved or melted in it, it is able to make an emulsion of the oil on anything we are washing, and so makes it clean.

WHY DOES AMMONIA CLEAN THINGS?

Ammonia is really a gas, but, like other gases, it can be dissolved in water, and it is more *soluble*, as we say, in water than almost any other gas. The solution of ammonia gas in water is what we usually call ammonia, and it is very largely used for cleaning things. Indeed, many people add what is called, not quite correctly, "liquid ammonia" to the water of their bath, for they find that it helps to make them very clean. "Liquid ammonia" is not a correct name, because what we call that is really water containing a lot of ammonia gas dissolved in it, as we have already seen.

Ammonia cleans many things far better than even strong soft soap, but it is so powerful that we cannot use it for everything. The reason why ammonia is such a splendid cleanser is, first, that it is an alkali, and so dissolves fats and oils, as we have seen that the alkalies in ordinary soap do. But ammonia is different from all other alkalies, because it is really a gas, and the great fact about a gas is that, if it gets "half a chance," it goes everywhere. Ammonia is thus the most searching of cleansers; not a speck of oily dirt, however well hidden, can escape it.

The next Questions begin on page 2327.

A STICK OF CHOCOLATE

CONTINUED FROM 2112

She came out of the shop with the end of the stick in her lips.

"What are you eating?" someone asked her.

"Chocolate," she said; and a little brown rivulet trickled from her lips to her chin.

"What is chocolate?"

She thought for a moment, and then answered with great positiveness:

"Something good to eat."

Someone took her hand, the hand that was not brown with chocolate, and walked away with her across the village square to the salt marshes beside the sea.

"Once upon a time," he said, "there was a man named Christopher Columbus, who discovered a great continent called America, and discovered in this great continent a little tree called the cacao-tree. There was something very strange about this tree: it grew buds, fruit, and flowers all the year round, and all at the same time. The Indians who inhabited America gathered the pods of this tree, split them open, took out the beans which they contained, dried them in the sun, and nibbled them just as you are now nibbling your penny stick of chocolate. Columbus went back to Spain with some of these beans in his pocket. Many years after, on June 16, 1657, a day which every boy and girl ought to observe as a sacred feast, there appeared this notice in an English newspaper called the 'Public Advertiser':

"In Bishopsgate Street.
in Queen's Head Alley,
at a Frenchman's house,
is an excellent West Indian drink called
Chocolate, to be sold,
where you may have it ready at any time,
and also unmade,
at reasonable rates.

"Fifty years after chocolate was the fashionable beverage of England, and restaurants began to appear in every town with the name, which you may still see, The Cocoa Tree. Aristocratic England drank the great drink of poor ignorant Indians. And now hundreds of boys and girls the world over are going into candy stores with pennies, and cents, and sous, and pfennigs in their hands, and coming out with the poor Indians' chocolate in their mouths.

"Now, if anyone asked you who was the greatest man that ever lived, would not your chocolate-stained lips hurry to exclaim, Christopher Columbus?

"And when you taste your penny chocolate, you should think of how that beautiful brown fluid on your American tongue was once a little bean tucked in a comfortable pod growing on a little tree thousands of miles across the sea; and of how a negro, singing a coon song, came with a long pole, which had a kind of scissors at the end, and nipped off the pod, and left it on the warm earth for a day; and of how another negro, in a straw hat and striped linen trousers, came and split

that pod, and took out the very bean you are chewing, put it in a basket and carried it away, singing about his picaninnies, to lie in a trench till it was fit to pack in a box, and go aboard a mighty steamer, and make the long journey to be roasted in the factory. If you had gone to buy that bean where it grew, instead of waiting for a ship to bring it to you, it would have cost you not a penny, but about $250.

She looked up and smiled.

"I've got nearly fifteen dollars in the savings bank!" she said proudly.

"My dear, you are a very important person. Your penny employs thousands of negroes, ship-builders, railway engineers, box-makers, sailors, porters, and factory hands. If children stopped eating chocolate there might be a panic on the Stock Exchange, the Paris Bourse, and the Dutch money market. But there are others besides you. The Prime Minister of England, the President of the United States, Field-Marshal Lord Roberts, Admiral Sir John Fisher, Mr. Roosevelt, nay, King George the Fifth, Emperor of India and the Britains Beyond the Seas—once upon a time they walked into sweet-shops and spent their pennies on sticks of chocolate. Bullseyes have their charm, almond rock is delicious, there is no question that toffee at certain seasons of the year is superb; but chocolate is universal and eternal. Every old gentleman in the world at some time has eaten chocolate. Perhaps that very stick that you have now quite eaten grew on a tree which sent chocolate to Queen Victoria in Windsor Castle, or perhaps the fruit of the same tree has travelled into every country across the sea."

In this cocoa-bean plantation the natives are busy cutting off the pods from the barks of the trees. In the picture on the previous page they are opening pods.

The work of drying the beans, which is being done in the garden seen in this picture, is undertaken immediately after they have been extracted from the pods. The beans are exposed in shallow boxes to the blazing sun, and are from time to time turned over so that all the beans get the heat. These pictures were taken in Ecuador.

Photos, copyright by Underwood & Underwood, N. Y.

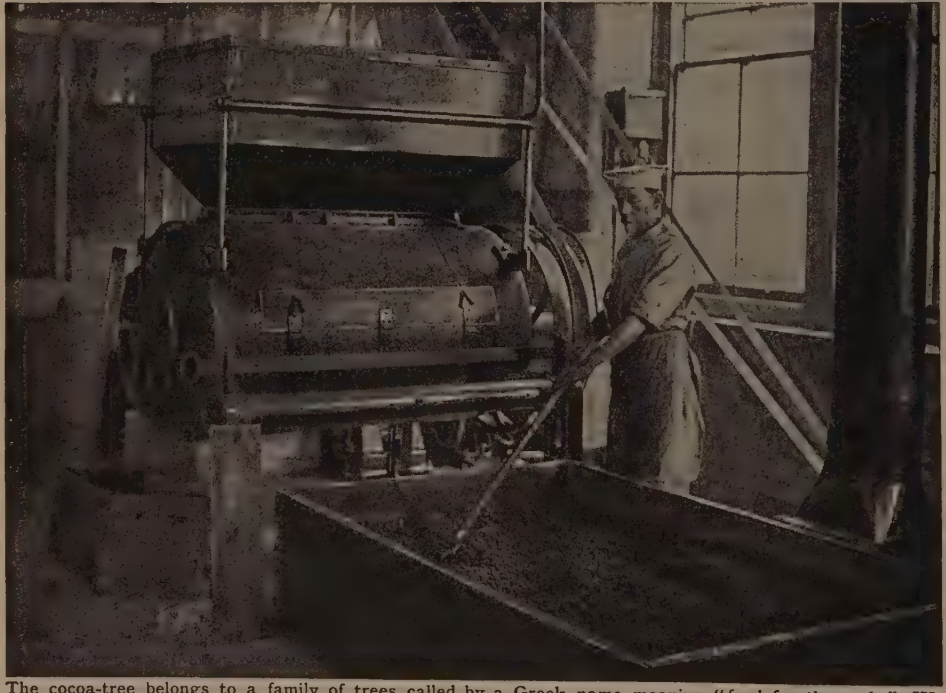
WHERE THE CHOCOLATES COME FROM

The picture on the left is a very close view of the cocoa-pods growing out of the stem of a tree in a plantation in Ecuador, one of the countries where this tree is grown. It needs a very hot climate, a deep, rich soil, and abundant moisture. When the Spanish crossed the Atlantic they found the natives using cocoa, and they introduced it into Spain, where it is still the favourite drink. The native on the right has split one of the pods.

Copyright by Underwood & Underwood, N. Y.

THE BEGINNING OF A CHOCOLATE CREAM

These are the cocoa-beans as you see them when they arrive at the factory. They grow in pods, looking like cucumbers, on trees in the West Indies, in the hottest parts of America, and in Africa. The pods, seen on the right, have to be opened, and the beans are taken out and dried. On the left of the picture we see the beans.



The cocoa-tree belongs to a family of trees called by a Greek name meaning "food for the gods." We should not think the cocoa-bean food for any human being if we tasted it in its natural state. It is then oily and bitter. So we improve it first by thoroughly roasting it. This picture shows the man roasting the beans.

FROM GRINDING MILL TO CHOCOLATE MOULD

When roasted and broken up, the bean will make either cocoa to drink or chocolate to eat. Here chocolate is being made for our candy stores, so the baked bean is ground in mills. The beans come out of these in the form of powder, and fine sugar is afterwards mixed with it to give the chocolate a pleasant taste.

Now we have got the substance of the chocolate, but, as it is still a powder, it must be melted by great heat into liquid paste, so that girls can pour it into moulds, which will make it, when cool, into pretty shapes.

WHERE THE EASTER EGGS COME FROM

The chocolate serves for many sorts of candy. Almonds and various other nuts are used, and dainty pastes, made into solid balls, are here being dipped into the chocolate, which forms a smooth and pleasant coating over them.

The girls are here making chocolate Easter eggs. They are fitted with hoops of smooth white cardboard, which will make the two halves of the egg fasten together, so that pretty presents may be put inside.

MAKING THE CHOCOLATES LOOK TEMPTING

Good candy must please the eye as well as the palate. The girls have basins of liquid sweetstuff beside them, and with a few touches of this they make a chocolate look twice as tempting as it did before.

So many varieties of chocolates are made in the factory that they have to be sorted as they come from the trays of the makers. Then they are ready to be packed in boxes, or to be sent in trays to the stores to be sold loose.

THE MACHINE AND ITS SILVER PAPER

One of the most interesting parts of the packing up of the chocolates is that done by this machine. A girl places the chocolates on a moving band, which carries them along the machine to a ribbon of tinfoil, or silver paper, as we call it. The machine then does a wonderful thing, wrapping each chocolate up separately.

The packers of chocolates do not forget that the eye as well as the mouth must be considered. Good chocolates are always pleasant, but they seem far more so when done up in a dainty box decorated with gay ribbon.

THE NEXT FAMILIAR THINGS BEGIN ON PAGE 2319

THE ROYAL MILITARY COLLEGE AND THE CITY OF KINGSTON

Photograph by Notman, Montreal.

The City of Kingston, often called the "Limestone City," has played an important part in Canadian history. Here Fort Frontenac was established in 1683, and the command entrusted to La Salle. It is a prosperous manufacturing city, and is the site of Queen's University, one of the best known institutions in the Dominion, and also of the Royal Military College, the buildings of which show across the water. The Martello towers, one of which appears on the right and the other on the left, were built many years ago for the purpose of defence, and served excellently then, though they would not be effective against modern artillery.

THE STATUE OF MAISONNEUVE, MONTREAL

Paul de Chomedey, Sieur de Maisonneuve, stands to Montreal as Champlain to Quebec. In 1642, with a small company of followers, he made a settlement which he called Ville-Marie de Montreal. There was no thought of profit, but it was to be a city of God upon earth. The settlers and their heroic leader faced all difficulties with enthusiasm, but the little settlement was many times threatened with destruction by the Indians, as well as by hunger. This spirited statue by the famous Canadian sculptor, Louis Philippe Hebert, was erected in 1905, in the Place d'Armes.

A GENERAL VIEW OF McGILL UNIVERSITY, MONTREAL

Photograph by Notman, Montreal.

The large number of well-equipped colleges and universities shows the Canadian attitude toward education. Among her universities, none surpasses McGill, a general view of which you see above. The bequest of the original founder, James McGill, has been followed by many magnificent gifts, which have enabled the faculties to develop an institution which is now known over the whole world. Several separate colleges are affiliated with the university, and its advantages are also open to women.

THE STATUE OF CHAMPLAIN AT QUEBEC

Photograph by Notman, Montreal.

In another part of our book we have told you something of Samuel de Champlain, the "Father of New France." This great man was born at Brouage, Saintonge, France, in 1567, founded Quebec in 1608, and died there in 1635. Few men have represented the finest qualities of their nation as well as he. This spirited statue by Paul Chevré, unveiled in 1898, stands on Dufferin Terrace, near the Château Frontenac Hotel (also named for a great Frenchman), as you can see on page 1243. Both remind those who pass of the heroes of earlier and harder days in Canada.

THE LIVING MARIONETTE

CONTINUED FROM 2139

THIS is a variety of entertainment that causes great diversion, and it is not at all difficult to do. Two players—one of them able to sing funny songs, to recite, and to tell stories—may give genuine entertainment to a large company by a living marionette performance. Almost any house contains all the apparatus required for the performance, as a few cast-off garments are all that are necessary in the way of attire.

The name often given to the entertainment is the German Dwarf, but a rather more appropriate name is the Living Marionette. A marionette is a doll, or puppet, that is made to walk, dance, or do acrobatic feats by pulling strings attached to it, and concealed from the audience. The living marionette is not a doll, but is living, and seems to be a little man or boy about two feet high, with an amount of agility that no boy possesses.

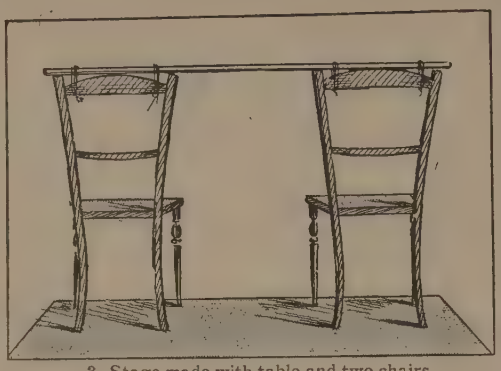
1. Making up for the living marionette

Two boys give the entertainment, and the first thing they must do is to provide a miniature stage. A table will do nicely, but it should have above it a curtain, or some dark cloth. Picture 3 shows how to construct a very good, but a very simple, curtained stage. Here two chairs are placed on the table with a space between them, and a long stick, or pole, is tied to the top rail, going right across both. From this stick, or pole, a curtain is hung so as to represent the surrounding of a little stage, which, as seen by the audience, looks like picture 2. Another good way to make a stage is to arrange a tall clothes-horse with a small board across two of the rails, and then to hang it with a curtain or a cloth. This method is possible only when a clothes-horse with the middle rail of a convenient height is available. This sort of stage without the curtain is shown in picture 4. Yet a third way, perhaps the best of all, is possible only when there are two rooms, one leading into the other. A small table, or box of the height of a table, is placed in the doorway, and curtains, or a dark cloth, hangs from the top of the door. Whatever kind of stage may be used, there should be no lights behind it, as a light might show the audience too much.

2. The living marionette on the stage

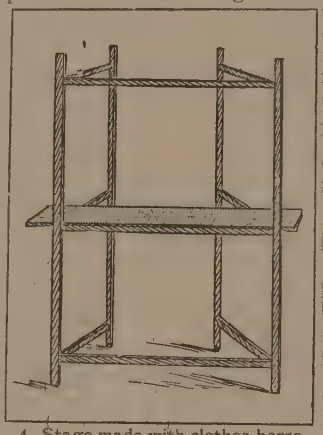
We will suppose that the stage is made, and that the two players are ready to attire themselves for

the performance. One of the boy players, the one who can sing and recite, draws over each hand and up each arm a stocking, and then puts a slipper on each hand. Perhaps, in the dressing up, it would be better to have a stage manager, and a girl makes a very good stage manager. The skill of a girl in the art of make-up is usually greater than that of a boy. Picture 1 shows two boys getting ready for the performance.



3. Stage made with table and two chairs

The second boy takes a handkerchief, or a pair of gloves, or a short cane in his hand, and puts his arms around the body of the first boy just under his armpits, as seen in picture 1. Now the stage manager, or manageress, drapes the two boys with a large cloak, or other article of attire, taking care to show the face of one boy only, and leaving visible the hands of the second boy and also the hands of the first boy with the slippers and stockings on. The marionette is ready to give his performance. He takes his stand on the stage, as seen in picture 2, which is a view of the stage from the front, where the audience will be sitting. When everything is in place the stage manager lifts or draws aside the curtain, and makes a little introductory speech :



4. Stage made with clothes-horse

"Ladies and gentlemen, you see before you the only genuine Circassian dwarf who has ever been taught English. His name is Pimpleskivitch, and, although you will not believe it, he is 365 years old. He has just escaped from Russia, as he thinks he has lived long enough in one country. He arrived the day before yesterday, and has since then learned English perfectly. He will now give you his performance. Pimpleskivitch, begin!"

The stage manager retires, and the dwarf begins. As he sings, or recites, or tells stories, he slaps the stage with his feet (really his slippered hands), and his hands (really the hands of the boy who is concealed from view) move about, wipe his face with the handkerchief, or twirl the cane. The effect is very amusing if the performer who is seen is able to keep up a running fire of entertainment. The boy behind must keep his body perfectly still, moving nothing but his hands. His is the most unpleasant part, because he cannot see what is going on, although he can hear the laughter and applause. The effect is heightened if the dwarf, or marionette, is provided with a false face, false nose, or false beard, or, if these be not available, he may have his face rubbed with a burnt cork, in which case he can appear as a genuine Congo dwarf.

A photograph of two boys giving their entertainment of a living marionette is drawn in picture 5. In this case they are made up to represent a dwarf woman. Picture 2, as may be seen, shows a clown, and this make-up can easily be made by the help of a piece of calico and a few pins. A good deal depends upon the make-up, as a really funny make-up strikes the audience right away, and makes the songs and jokes and dances seem much funnier than they would with a poor make-up. Especially if the performer is rather deficient in humour, he should have a particularly good make-up. With a wider stage two pairs of performers may exhibit at the same time. This increases the probability of success of the entertainment, as it gives the opportunity for dialogue. When there are two pairs of performers it is best that one pair should represent a dwarf woman and the other a dwarf man. Even although this entertainment is very simple, it should be practised once or twice in private before the first public performance is given. Also the songs or jokes should be carefully committed to memory, that no hitch may occur in the performance.

5. Photograph of a living marionette

A CHRISTMAS-TREE FOR THE BIRDS

CHRISTMAS would not be Christmas without a Christmas-tree. But have you ever thought, when you have been enjoying yourself, that the winter, which brings lots of fun for all of us, is a very uncomfortable time for the poor things who have not any warm homes?

Perhaps, on some cold morning, you have looked out of your window, and have watched the birds flying about among the bare branches of the trees in the garden, searching the ground in the hope that some kind person has thrown out a few crumbs for them?

Have you not sometimes wished there was a Santa Claus to bring a tree full of good things for the birds? Perhaps it never occurred to you that *you* might be the birds' Santa Claus? Well, we are going to see how to make a Christmas-tree for those poor little mites.

First, we must get a small fir-tree that can be put into a pot. Probably we shall find one in the garden, and will be allowed to dig it up. If not, we can buy one about Christmas-time for a quarter.

When we have got our tree planted in a large flower-pot, we must get some small baskets—the tiny ones that candy is sold in will do splendidly—and tie these baskets to the branches of the tree. We can put all sorts of things into these baskets—bread-crumbs, nuts, little pieces of crust or toast from the breakfast table, or some of the seeds that are given to tame birds.

Then we must hang up tiny pieces of cocoa-nut. These are for the tomtits, and there is nothing that they like so well. Other birds are very fond of little pieces of suet.

We can make our Christmas-tree look very pretty with some bright pieces of cloth and ribbon, or coloured paper made into little bags to hold bread-crumbs, and then, when it is quite finished, we must put it out in the garden or on the window-ledge of our own room. At first the birds will not understand, because nobody has ever taken the trouble to make a Christmas-tree for them before, and perhaps they will think it is some sort of trap. But presently some of the bravest ones will come. Then we shall see them perch on the branches, and look round in every direction to see if there is any danger.

We can watch them through the window, and they will not be frightened if we do not move. As long as we keep quite still, they will not think we are going to hurt them.

In a little time the birds will put their little heads in the baskets, and give a little twitter of delight when they find the good things there. Other birds will be watching them from the trees, and, when these see that the braver ones have not been hurt, they will come too. When the tree has been out a little while, we shall see perhaps forty or fifty birds of all sorts fluttering round it.

When they have eaten everything, we can refill the baskets. Then next morning we should put the tree out again, and we shall be surprised to find that all the birds will be waiting. They will have told all their friends, too, and those who came the first day will have been spreading the news of the wonderful tree for miles round.

If you watch them carefully, you will find that you can recognise many of them, because there is just as much difference between birds as there is between people, if only you look at them closely. And they have all sorts of different characters, too. Some are quarrelsome and some are timid. Some try to push the other birds away when they have found a little basket full of good things, and others are generous little fellows who call the others to help them enjoy anything very good.

If we put our Christmas-tree out every day for a week, we shall find that by degrees the birds grow more and more tame, till at last we can stand quite close to the tree and watch them. If we are careful (the great secret is never to move quickly) the robins, which are the boldest of all our birds, will learn in time to take bread-crumbs from our hand, but we must not be angry with them if they will not do this at first, because we must remember that we seem great giants to them, and some people are so cruel that we must give them time to learn to trust us and treat us as their friends.

A CHRISTMAS-TREE FOR THE BIRDS

A CHRISTMAS GYMKHANA

"A GYMKHANA," Meg explained very carefully, "is a party at which everybody plays new kinds of games—funny games that make you laugh, and exciting games, with prizes for those who win."

When all the children had arrived, they found that the drawing-room had been almost cleared as if a dance were to take place; but down the centre of the room they saw two rows of bottles standing upright, with little Christmas-tree flags stuck into the corks. There were eight bottles in each row.

The children could not think what they were for until Meg explained. She said that the first game was to be a driving match. Two girls were to be blindfolded and harnessed together with ribbons, and a boy would drive them up and down the room and would steer them first to the right and then to the left between the bottles, so that none of them upset.

Two boys and four girls would begin together, and the team that got back to the starting-place first would win.

Everything was arranged in a minute or two, and the girls, with handkerchiefs over their eyes and the harness of bright-coloured ribbons tied to their arms, stood ready to run the moment the word was given.

The boys who were to drive them were told that they must not speak to the girls, but must steer them between the bottles by pulling on the reins.

Everyone was quite silent while Meg clapped her hands and then called out, "One—two—three. Go!"

The girls dashed off in a moment, and the boys had to hold them back with the reins to keep them from going too fast. Of course, the boys could see where they were going, but the girls could not, and sometimes they all got so excited that, when the driver tugged at the reins one way, they all went off in another direction. One team turned right round and went in the wrong way altogether, and before they could be got right again they had upset two of the bottles.

One team got to the end of the row of bottles without upsetting a single one, and then turned round to come back. But they turned the wrong way, and ran right into the others and all got mixed up.

At last they got the reins untangled, and then there was a fine race down the room. The two teams were so close at the finish that everyone thought they would get back together, but at the last moment one of the girls just touched one of the bottles with her dress and knocked it over. This stopped them for a second, and so the other team won.

After this first driving race everybody wanted to try, and Meg said that the teams that won must stand on one side of the room and those that lost on the other. Afterwards, those that won would try again, and go on trying until they were beaten.

Of course, after about half an hour there were only two teams left, and then came the most exciting race of all, because the one that won this time would have the prize.

When all the driving races were over, Meg said they would have an "egg and fan race."

Two egg-shells were brought in. They were quite hollow, for the inside parts had been blown out through little holes made at each end with a pin.

These two eggs were placed on the floor, and two boys were told that they must crawl along and blow them to the other end of the room, where two girls would be waiting with fans. The girls would have to fan the eggs back to the starting-point, and, of course, the one that got back first would win. This was even better fun than the driving race, because the boys looked so funny crawling along on their knees and trying to blow the eggs so as to make them go straight. It was much more difficult than it looked, because the eggs were not round, and therefore they would roll off in every way but the right one.

The girls found that it was even worse to fan the eggs along than to blow them, for, instead of going straight, they would go first on one side of the room and then on the other. One girl got so angry with her egg that she gave it a bang with her fan and broke it.

The children who were watching laughed so much that they thought they could not laugh any more; but Meg presently suggested another race more exciting still.

Two big clothes-baskets were brought in, and to each one there was tied a rope long enough to reach from one end of the room to the other. The baskets were placed at one end and the ropes stretched to the other.

Then two boys and two girls had to stand together, and when Meg called out "Go!" the girls ran down the room as hard as they could and jumped into the baskets. The boys had to pull them back with the ropes.

This was great fun. The boys tugged and tugged, and first one basket with a girl in it would be in front, and then the other. All the children shouted, and said that this was the best sort of race yet. The girls were so anxious to try that they could hardly wait for their turns. It was so fascinating to be pulled along like that, especially when the baskets were so close together that no one could tell which would win.

When all the races were over, Meg said they would finish up the evening with a dance—but not an ordinary sort of dance. It was to be what she called a cotillon.

Instead of the boys asking the girls to dance, the girls would choose their partners, but they would have to do this in all sorts of funny ways.

Meg brought in a big doll made of pillows, dressed up in one of her own dresses.

She put two chairs in the middle of the room, and then made the pillow-doll sit on one chair and one of the girls on the other. Then two boys came, and the girl had to give the doll to the boy she did not want to dance with, and then she waltzed round the room with the other boy.

This looked very funny, because one boy always had to dance with the doll, and it looked perfectly absurd.

A CHRISTMAS CHARADE

HERE is a pretty little charade that can be entirely acted by children. It would make a charming entertainment for Christmas Eve, and would not only interest young people, but would be amusing to everybody in the audience. The word that is to be guessed is, of course, hidden in the scenes of the little play.

The charade can be acted in a drawing-room without much preparation. All you will have to do is to move the necessary furniture to one end of the room, and then place a lot of chairs at the other end for the audience.

If possible, try to arrange things so that the part of the room that will be your stage is close to the door. Then the actors will be able to make their entrances and exits nicely. If this cannot be done, a screen should be put up, and the performers must remain behind this when they are not acting.

FIRST SCENE

A room. At a table Princess Myra is sitting knitting. As she knits she sings:

A Princess sat in a castle grim,
And weary at heart was she,
And her eyes were dim as she thought of him—
A soldier brave
Far across the wave,
A soldier of low degree.

She stops singing and rises from her chair. For a moment she stands listening. Then the door opens, and a young man rushes in and kneels before her.

PRINCESS: Why are you here? You must go! You must go!

BRIAN: I have come so far to see you, Princess. Do not send me away.

PRINCESS: You are in danger here. If my father found you he would have you imprisoned.

BRIAN: Princess, I love you! I have travelled a thousand miles to see you. I cannot go.

PRINCESS: You must! You are in danger!

BRIAN: I am a soldier!

PRINCESS: For my sake you must go.

She places her hands on his shoulders and looks into his face.

BRIAN: You do not love me then?

The Princess turns away and takes up her knitting. She hides her face. For a moment he watches her; then he leans over her shoulder to see at what she has been working.

BRIAN: What are you making, Princess?

PRINCESS: It is but a little thing—a knitted mat of silken threads, such as we ladies make to pass the days. It was for you—see, it is nearly finished.

BRIAN: It is of red silk. Red is for love!

PRINCESS: And 'tis a soldier's colour.

He kisses her. She starts as she hears somebody coming.

PRINCESS: Go! You must go! To-night I will send a letter to you. But now you must leave me.

He kisses her once more and then leaves the room. She leans over the table and covers her face.

SECOND SCENE

Brian is sitting by a bare table, on which is a lighted candle. He is reading a letter. His sword lies in front of him.

BRIAN (*reading aloud*): "I love you, Brian. But if my father knew he would send me far away, and I dare not think of what would happen. Brian, I am a Princess; they say I must marry a Prince, who some day will be a King, like my father. I have given my heart to you, but you must be worthy of it. Go! take your sword and win fame. Come back when you have won a soldier's honour, and then, maybe, my father will ennoble you, and some day consent to our marriage."

For a few moments he sits twisting the letter in his hands. Then he kisses it, and puts it into his pocket.

BRIAN: I must win a soldier's honours. Ah, well, I can but try! It is her wish; and if I lose my life, it is well lost. I must try! I must try!

Taking up his sword he leaves the room.

THIRD SCENE

A room. The Queen, Princess Myra's mother, is standing. Princess Myra is kneeling on the floor before her.

QUEEN: My daughter, for three long years you have shut yourself in this small room. Your eyes have grown red with weeping. Many princely suitors have asked your Royal father for your hand, but to all you have refused to listen. This must not be, my child. The time has come when you must marry one of proper rank.

PRINCESS: Mother, I cannot! I have vowed to marry no one unless he be of my own choice.

QUEEN: This is madness! The Prince we have chosen for you is young, handsome, and brave, a soldier who has risen to save our country and our throne. For his deeds your father has raised him to Royal rank.

PRINCESS: But, mother, I cannot marry one I do not love.

QUEEN: None could help loving so brave a soldier. And his wealth is equal to his bravery.

PRINCESS: I care not for his money. I will not see him.

QUEEN: You shall see him, for he comes now.

Brian enters. He stands watching them for a moment. The Princess is still kneeling before her mother. Suddenly she looks up and sees him.

PRINCESS: Brian! You have come back at last.

She jumps up, runs to him, and throws her arms round him.

BRIAN: At last! Say I am not too late, Princess; say I have not come too late.

PRINCESS: I would have waited for my soldier all my life. I care not if you are poor. I will marry you, and no Prince!

QUEEN: But, child, this is the Prince!

BRIAN: Yes, Princess, I am the Prince of whom the Queen spoke. You sent me away to win fame and fortune with my

sword. I have won a soldier's honours, and a fortune that——

PRINCESS: I did not send you away because you were poor, Brian.

BRIAN: 'Twas your father who made me rich that I might have sufficient for our state. Honour and wealth are ours, Princess, and now——

She kisses him, and speaks very softly.

PRINCESS: My Prince!

The hidden syllable in the first scene is *mat;* in the second, *try;* in the third, *money.* The complete word that the audience have to guess is, therefore, *matrimony.*

The Princess should wear a long white dress reaching to her feet. Her hair should be bound with golden bands made out of gilt braid, and round her waist she should wear a golden girdle made of the same braid. The soldier's uniform can be made out of a pair of blue serge trousers and an Eton jacket. A strip of the gold braid must be sewn down each leg of the trousers, and the Eton jacket must be worn with the lapels turned over and pinned across the chest. It should be covered with the material which is called "Turkey Red," and some gold braid should be sewn on the front. A helmet with brass chin-strap can be bought at a toy-shop for a quarter. The sword and belt could be made with wood and silver paper, but the toy-shop ones sold for a quarter look neater.

The Queen should have a dark dress of velvet. From her shoulders should hang a long train of some dark crimson cloth, and cotton-wool should be sewn round the edge to look like ermine. A crown can be made out of cardboard covered with gilt paper.

A LITTLE GARDEN MONTH BY MONTH

WHAT TO DO AT THE END OF DECEMBER

WE shall find that much sharper frosts are to be expected after Christmas and the New Year than before. Even our pot-plants on our window-sills may suffer from frosts at night. A great protection is to be found in newspaper. If we fold one and line the lower part of the window with it we keep out a good deal of cold, and we may quite lightly spread another over the plants themselves. This is the method often employed in cottage homes, and, so long as it is effective, it matters not that it is a homely and rough-and-ready way. It is far better than letting the plants suffer.

But suppose our pot-plants have become bitten by the frost, and we take them into our hands, only to see limp, almost lifeless specimens. What are we to do? First of all we must see to it that not a ray of sunshine touches these frost-bitten plants. We then water them with cold water from the rose of a can all over the foliage, and after that *put them in the dark* for a day or two. It may be that even these measures will not save the plants, but it is the utmost we can do, and sometimes plants really badly frost-bitten have thus been saved.

During the winter such plants as geraniums may be allowed to become quite dry before more water is given, and other plants, too, though the soil must never be allowed to become dry as dust in the case of hard-wooded plants like azaleas that already have their flower-buds formed; and, of course, the bulbous plants that we are forcing in pots or growing in shell and fibre must never suffer for lack of moisture. We want to hit the happy medium here—never to keep them sodden with water, nor to let them suffer for want of it. We have to remember that, as we are bringing them forward by growing them in the warmth of our rooms, they are in active growth, and therefore must not receive a check.

We must always remember that, wherever we have plants growing, they are taking up the goodness of the soil, whether in the ground or in pots; not to any great extent at this time of the year, because the majority of plants are making little or no growth—merely, as it were, resting. But with the first breath of spring, life and growth will be stirred into wonderful, silent activity again; new roots will be formed under the soil and new growths above it. If our plants are at that time to make the most of themselves, it is quite likely they will need more food than the soil has to give them, if this should happen to be more or less exhausted. Now, many things make up the plant food-material which we put on the soil to be washed down by the rain or dig into the soil if we get the opportunity. Thus, stable manure, soot, and, on many soils, lime are all very valuable. Then, if we happen to have a heap of leaves that have been decaying for two or three years, we have in this valuable plant soil, and even in burnt refuse, cabbage-stalks, and such stuff; and we may dig that also into the soil—not just at this time, but when growth is restarting, for even burnt vegetable matter helps to feed living plants.

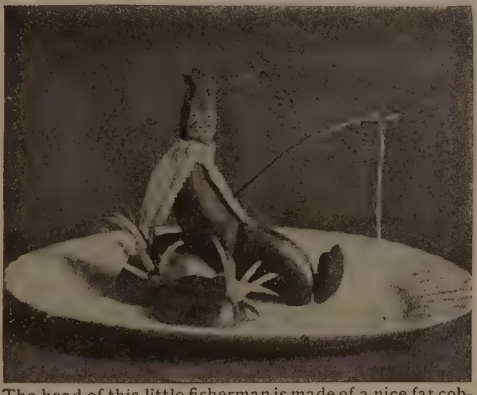
It is rather more difficult to deal with plants in pots, but these, too, may want a little extra feeding at the time when the flower-buds are forming and until they have begun to open. Very weak soot-water may be given occasionally, and this is especially valuable for helping to make the foliage of a deep, healthy hue. Also, in tins, we may buy various fertilisers and concentrated manures, like bone-meal and others, and should follow out the instructions exactly, in giving to the pot-plants. As a rule, a small quantity is dissolved in a can of water and administered in this way. Just an occasional watering, with this plant-food dissolved in it, does much to make fine, healthy plants. But even pot-plants do not need this encouragement in mid-winter.

And now there is one delightful occupation we may give ourselves even when the world is white with snow, and that is to secure a seed catalogue, and go through it again and again to decide, even in these winter days, what we intend to grow to make our gardens beautiful in the summer that will be coming.

THINGS WE CAN MAKE AT THE DINNER-TABLE

The body of this perky little bird is made from a banana. His beak and two legs are made from an almond. He stands on a little mound of half an apple, and near by is a nest made of shavings of apple partly dried, wherein lie four eggs, which are white grapes. His feather tail and wings are formed of real feathers.

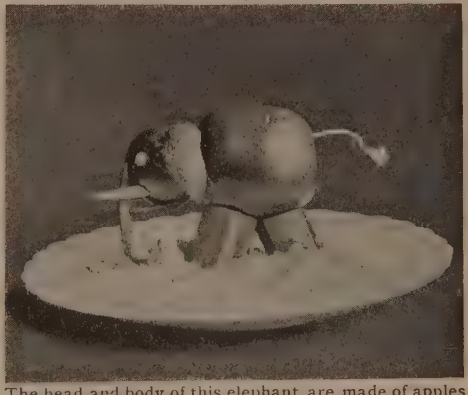
A couple of piggies may be made from short, slightly curved bananas. To complete them, insert two ears and four legs made from strips of almond, and a curly tail made from a strip of apple partly dried. Piggy's eyes and mouth may be coloured by cochineal. Thin wisps of apple, partly dried and twisted, provide a bed of straw.



The head of this little fisherman is made of a nice fat cob-nut with the features in sugar icing, while his body is a banana cut in half and twisted. His feet are two almonds This young man sits and fishes away on a bank formed of two halves of apple, while the rushes at each side are made from thin strips of apple or almond.

This quaint clown is made of a banana, his features being marked with cochineal, and a piece of almond for his nose. Three currants are rosettes on his coat, two dates form his shoes. On the left a string of raisins is his sausages, and on the right are two legs of mutton, in the form of figs, which Joey has stolen.

A nice pear forms the head of this rabbit, while his body is a golden orange. His ears are made of wafer paper slightly browned. His eyes are indicated in sugar icing; his whiskers are thin strips of apple, while he reposes on a bed of the same fruit. The only part which is not edible is the small fluffy tail made from a piece of cotton-wool.



The head and body of this elephant are made of apples secured together by two pieces of almond. Tusks of the same nut are then inserted. The trunk and ears are cut from candied peel, and slipped into slits in the head. The legs are pieces of banana, while the tail is a strip of apple partly dried. The ground is sugar icing.

STAINING AND POLISHING WOOD

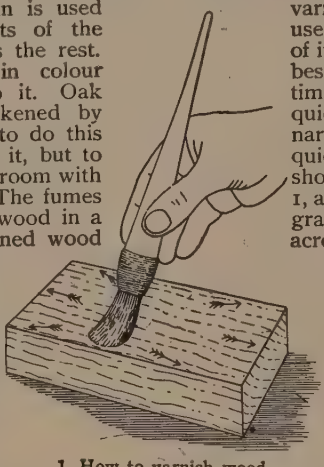
WOODWORK is stained to improve its natural colour. The difference between stain and paint is that stain sinks into the fibres of the wood, and colours or dyes them, but leaves the grain of the wood showing as plainly as before. Paint forms an opaque coat on the surface which quite conceals the material beneath. Generally stain is used to make a cheap wood look like an expensive one. The colours used are chiefly imitations of walnut, mahogany, rosewood, and other woods. These stains are used on lighter coloured common woods, such as common whitewood, pine, and deal, and only for good appearance and not to deceive people, for anyone with a little experience can tell what the wood really is.

Sometimes, though not often, colours quite different from that of any wood, such as green, blue, or red, are used as stains. Very often fancy woods are darkened and improved in appearance by stains of the same colour as themselves. Stain is used also to darken lighter parts of the wood to the same shade as the rest. Wood may be darkened in colour slightly by rubbing oil into it. Oak and mahogany can be darkened by ammonia. The usual way to do this is not to wet the wood with it, but to shut it up in a case or small room with saucers of liquid ammonia. The fumes of the ammonia darken the wood in a few hours. In all cases stained wood must be darker than the natural colour, for a dark surface will show through a lighter stain.

Stains for wood are sold ready for use in small bottles by all dealers. They may be put on with a brush, or rubbed in with a rag. The neater way is to use a brush. Generally two coats are given. With only one coat it is not easy to keep the same shade of colour all over, for any overlap with the brush in applying the first coat shows darker than parts over which the brush has passed only once. In succeeding coats this becomes less and less noticeable, so that the best result can be obtained by using weak stain and applying a number of coats, allowing each to dry before putting on the next. The surface must be smoothed with sandpaper before the first coat and after each coat has thoroughly dried. Otherwise it will feel and look rough, for anything which wets the wood causes its surface to roughen as it dries. Varnish stains are often used instead of simple stain. These are varnish and stain combined, and save the trouble of staining and varnishing separately. If done separately the wood must be stained before it is varnished.

VARNISH. Varnish does not conceal the character of the wood beneath it, for it is almost transparent unless something is added to colour it. It simply produces, when dry, a hard, glossy film on the surface, which protects the wood from dampness and dirt. Quick-drying varnish consists of shellac dissolved in methylated spirit. The spirit evaporates and leaves a thin layer of shellac on the wood. Shellac varnish is used only for indoor work. In making varnish for work exposed to the weather it is necessary to use linseed oil instead of spirit, and copal, mastic, amber, or dammar in place of shellac. Varnish may be used either on the bare wood or on paint.

Varnish is applied with a brush. Two or three coats are put on, each being allowed to dry and then smoothed with fine glasspaper before applying the next. For large surfaces a large brush should be used, so that the varnish can be spread quickly. For small work a small brush is better. The varnish should be put on uniformly, so that some parts shall not be more thickly coated than others. Varnish should not be allowed to run over edges or corners of the article being varnished, and the brush should be used so that it does not leave marks of its own all over the work. The best way is to take one surface at a time and cover it with varnish as quickly as possible—that is, if ordinary shellac varnish, which dries quickly, is being used. The brush should be held as shown in picture 1, and should move in line with the grain of the wood. If it is used across the grain, marks of the brush will show more distinctly. To prevent varnish from getting squeezed out of the brush and running over the edges of the wood, the brush should always move outwards to the edges, as indicated by the arrows in picture 1. In approaching the ends of the wood it goes directly to the edges, but in passing along the sides its direction is only very slightly diagonal towards the edges there, so that the movement shall be as nearly as possible in line with the grain. Spirit varnish dries in a few minutes, but to obtain the best results each coat should be allowed several hours to harden before sandpapering it down for the next. After the first coat, old sandpaper worn smooth should be used, and the work is not rubbed down at all after the final coat. Sandpaper should always be rubbed in line with the grain of the wood. If rubbed across, it scratches the surface too much.



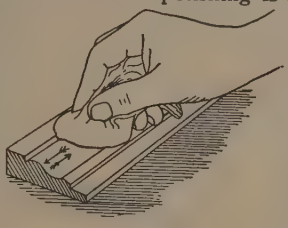
1. How to varnish wood

POLISH. The difference between polishing and varnishing is chiefly in the method of application, for shellac varnish and polish are practically the same thing.

The distinction between varnishing and polishing is that varnishing is done with a *brush*, and polishing with a *rag*. Polishing requires more skill and time, but it gives a smoother and glossier surface than varnishing. It is important in polishing that the pores of the wood shall first be thoroughly

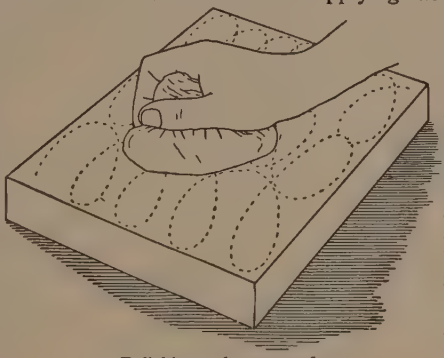
filled, so that the polish cannot sink in and lose its lustre. A number of applications of polish with long intervals for drying will do this, but it is quicker and cheaper to fill the pores with some other substance before beginning to polish. The filler is generally whiting or plaster of Paris dissolved in water, turpentine, or oil, and coloured to match the wood. It is rubbed in and allowed to dry, and then the surface is sandpapered smoothly. The wood is now ready to receive the first application of polish.

The rag used in polishing is called a *rubber*. It should be a piece of soft white linen. This is used as an outer covering to a pad of cotton-wool.

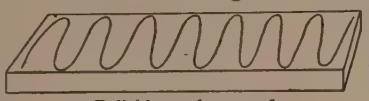


2. Polishing

The cotton-wool is moistened with polish, and the single thickness of rag encloses it and is drawn up like a pudding-cloth at the top and grasped by the hand while it is used. Picture 2 shows a small rubber held in this way by the thumb and fingers only. Picture 3 shows a larger one. The pressure on the rubber should not be heavy, and a few drops of linseed oil are put on the rag to make it move about freely without tendency to stick. The polish is put on the cotton-wool only, and gets squeezed through the rag in rubbing. The method of rubbing depends to some extent on the shape and size of the work. First, it is necessary to cover the surface of the wood with polish as quickly as possible. This is done by moving the rubber in large sweeps either with or across the grain, or both. The direction is not important as long as the polish is rubbed uniformly all over the surface. On a moulding, as in picture 2, the movement would be entirely backward and forward lengthwise. On a large flat surface, as in picture 3, the rubber may be moved in curves or spirals, as shown by the dotted lines. These are only drawn as lines, but the broad surface of the rubber would, in following them, polish the entire area of the wood. On a long surface of moderate width the first movements of the rubber might be as shown in picture 4. For getting into the corners of panels and similar parts the rubber must be squeezed into a pointed form which will reach those parts. After the polish has been applied in this manner, the work must be laid aside for at least a day. Then a second application is given in the same way as the first. In the best work this process is repeated a third time or even a fourth, and long periods are allowed between each to allow the polish to sink in as much as it will. In sinking in, and hardening, it loses some of its gloss, and as long as this occurs the work can be improved by fresh applications of polish. This is called *bodying in*. The final process in polishing is called *spiriting off*. In spiriting off, the rubber is moistened with wood alcohol instead of polish, and is rubbed lightly over the surface to remove smears caused by the rubber in bodying in, and also to take up the oil, which, when present, gives the surface a dull, greasy appearance. The last movements of the rubber should follow the grain of the wood—that is, the rubber should move in straight lines with the grain, and not across or in curves.



3. Polishing a larger surface



4. Polishing a long surface

LACQUER. This is used chiefly for coating polished metal to prevent rust. It is more generally used on brass than on any other metal. Brass does not rust, but soon turns dark and dull if unprotected by lacquer. Before applying lacquer the surface of the metal should be made as bright as possible. When the surface is not bright it is because it has a lot of little depressions and lumps, too small to be seen, but their effect is to refract the light in many different directions. When a surface is absolutely smooth all its parts receive and reflect the light in the same direction, and a shiny appearance is the result.

This shiny appearance can be preserved for a long time by protecting the metal with lacquer. In time the lacquer wears off from the parts of an article that are constantly handled, or in the course of years it becomes pitted and cracked by the action of the air, which eventually gets at the metal beneath. Until this happens the metal remains as bright as when the lacquer was put on. Lacquer is sold in small bottles and is applied with a camelhair brush. It may be obtained either colourless or coloured. It is sold in all the primary colours, and these can be varied by mixing. The remarks about the use of the brush in varnishing apply to lacquering also, but in lacquering extra care must be taken to put it on free from dust and air-bubbles, for these allow the air to get at the metal.

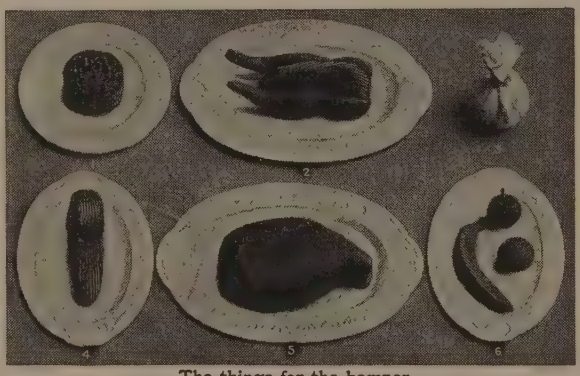
Lacquering is simpler now than it used to be when heating the metal was a necessary part of the process. Formerly the lacquers used were practically the same as the varnish used on wood, but they are now of a metallic character and better adapted for their purpose.

FILLING A DOLL'S CHRISTMAS HAMPER

WHAT are the things we should like to pack in the Christmas hamper which we learned how to make on page 2131, if only we could get them small enough to go in? It would be delightful to be able to put in a tiny turkey, and a brown ham, also a Christmas cake, a plum-pudding, and last, but not least, some fruit—some beautiful golden oranges from Florida or California, bananas from the West Indies, and some fine Oregon apples.

However, as we cannot get all these delightful things by wishing for them, the next best thing is to try to make them ourselves. But how can we?

There is a delightfully simple way of doing this. From a piece of clay which we can buy from any dealer in artists' materials, we can model our things, and afterwards paint them the exact shades to represent the various articles. If we cannot get this clay we need not despair, for we can make our own modelling material from flour and water, which we must mix into a stiff dough and knead until it is quite firm and clean, and does not stick to our hands. If we use clay, there are just one or two things which we must remember. The more clay is handled and worked the more plastic it becomes. Fresh clay easily breaks, and cannot be modelled so well or worked with the same freedom as well-used clay. Clay that is kept in good condition will not stick to our fingers, and we shall find it a clean and pleasant material to work with.



The things for the hamper

If our clay should become hard and dry, we must break it up into little pieces, sprinkle it slightly with water, and wrap up in a wet cloth until it becomes soft again.

Whenever we have done using our clay and wish to put it away for a time, if we are wise we shall wrap it in a wet cloth squeezed (not wrung) out of cold water.

When we have obtained our clay or dough for the modelling of our articles, an old slate and our box of paints are the only other things required.

We must be careful to make all the things in proportionate sizes: they would not look at all real if we made an orange as big as a turkey! We must take a piece of clay as large as a big walnut for the boiled ham, a piece rather smaller for the turkey, one half the size for our plum-pudding and Christmas cake, and several pieces as large as big peas for the oranges, apples, and bananas.

First we will make the orange, because it is the simplest of them all. Just at this point it will be as well to remember that the things made of clay will dry and harden ready for painting if left for a few hours on the slate, but if made of dough they must be put into a cool oven or before the fire until they become quite hard.

When we try to model the various things, we shall be astonished to find how little we really know about them, so it will be well to have a real orange, apple, or banana to work from. To form an orange we must work the piece of clay between our finger and thumb until it assumes a perfectly round shape, very, very slightly flattened on one side. Prick it all over with the point of a wool needle which has a round or blunt point, to represent the pores found in the skin of an orange. When it is dry paint it with *Chrome Orange*.

To make our apple we proceed in exactly the same way, but we must slightly flatten the ball at top and bottom, and with a pointed match-stalk hollow out a tiny groove round the eye and another at the base, where we insert a tiny twig to represent the stalk.

Touch the eye of the apple with black paint, and paint all the rest of the apple green, using *Olive Green* with a touch of pale *Chrome Yellow*, or, for a red-cheeked apple, give a touch of *Crimson Lake* on one side, gradually merged into the green.

To make the pudding, we take a piece of clay as large as a nutmeg and make it round like a marble. Cut a small square of white muslin and tie it up while it is still soft. Finally, we must give the cloth a few dabs of brown paint to represent stains from the pudding inside it.

Our Christmas cake requires the same amount of clay as the pudding. Roll it into a ball, press out cylinder shape, and flatten one end on the slate. With a pointed match-stalk make the top rough to give it the appearance of a plum-cake. Then paint it a good brown, using *Vandyke Brown* paint and *Chrome Orange* in equal proportions. Afterwards give tiny black dots all over to represent currants.

A fine banana is formed from a little cylinder of clay. Press three pointed edges up along the cylinder, curve it slightly and bring one end to a point. To colour the banana, use pale *Chrome Yellow* with little touches of brown here and there, as in a real banana that is quite ripe.

We must shape our ham from a piece of clay the size of a large walnut by first making a ball, which we gradually press on the slate to flatten the under side. At the same time we must nicely curve the upper side

with the fingers and draw out the bone at the end. As our ham is supposed to be ready cooked and glazed for the table, we must paint it a rich brown, using *Brown Madder* paint for the purpose.

An excellent tongue is formed from a piece of clay a third of the size of the ham, shaped as in the picture on page 2258, and coloured the same shade as the ham.

Last comes the turkey, made from a piece of clay about the size of a small walnut, from which, first of all, we model two small legs as in picture 2, and two little flat pieces for the wings. The rest of the clay we roll into the shape of a cylinder; we must flatten one side, and with our fingers draw up the top to represent the breast-bone of the bird. Press the legs and wings into place as in picture 2, and finally we must paint the whole a pale brown, using *Chrome Orange* with a dash of *Vandyke Brown* paint. Last, but not by any means the least, we wrap up daintily each article in a square of white tissue-paper or cotton-wool, remembering that the common things of life may always be made more beautiful with the exercise of a little care and taste in their arrangement.

If we pack our hamper properly, the things will travel safely to their destination. We must place our ham at the bottom, as it is by far the heaviest article; after that the turkey and tongue side by side, putting little pads of cotton-wool in the hollow places, so that the legs of the turkey do not get broken. Above these come the pudding and the cake, and finally the fruit, of which we must make sufficient to fill up all the empty space, and our little Christmas hamper is complete.

The little friend who receives the hamper will be able to dish up the various articles on the tiny dishes of a doll's tea or dinner service, and have delightful times playing at dolls' parties, shops, and restaurants.

THOUGHT-READING BY CARDS

THIS is a trick that needs the assistance of an accomplice. Some cards—six, or nine, or twelve, or as many as you like—are spread out, face upwards, on a table. The thought-reader goes out of the room, and the accomplice, or stage manager, as we shall call him, says: "Will anyone please pick up a card, any card, and hand it to me?"

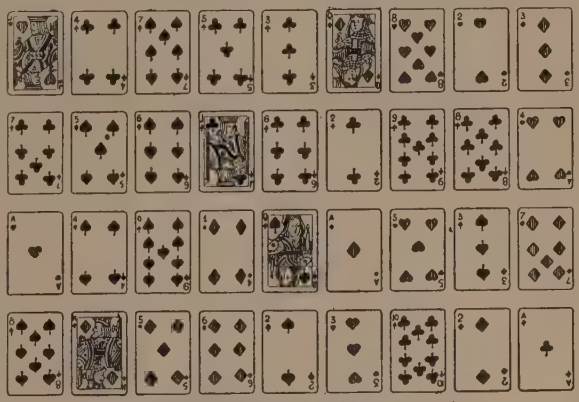
1. A row of cards before touching

Someone does so, and the stage manager puts it down again in the same place. The thought-reader comes into the room, and by merely looking at the cards he knows which card has been lifted and replaced. But he need not say so right away. He can go up to any one of the company, and after saying "Think of the name of the card that has been touched," he holds his or her hands or head and then says what card it was.

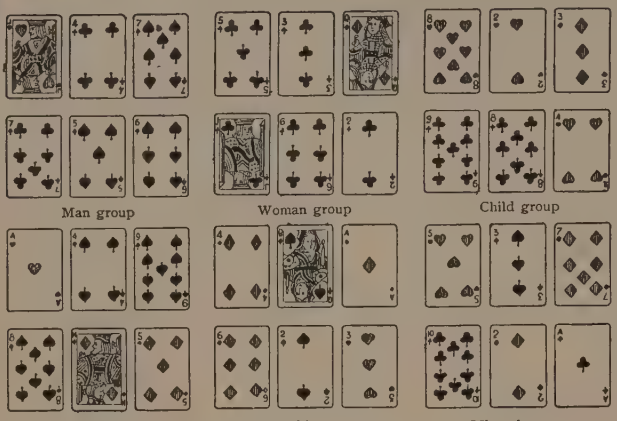
2. The same row of cards after being touched

How does he know? Easily enough. The cards must be of the kind that have a line round each, outside the spots or picture. Many cards are of this variety. They are always cut so as to leave a wider margin at one end than at the other. As the cards are spread out on the table in the first instance, all the broad margins are put facing one way. When the accomplice replaces the card, he puts it back with the narrow margin at the end where the broad margin was before, and the conjurer sees by merely looking at them which card has been taken and put back. Picture 1 shows a number of cards as they would be before being touched, and picture 2 shows the same cards after the conjurer comes into the room. It is plain that the three of clubs is the selected card. This trick is impressive because the accomplice says not a word and makes not a sign. Indeed, he may be sent out of the room or behind a screen before the conjurer comes into the room.

Another thought-reading card trick is very clever and very puzzling. Thirty-six cards are used, and again there is both a conjurer and an accomplice. The cards are spread out in four rows, with nine cards in each row, as seen in picture 3. The conjurer goes out of the room and one of the company touches a card. Then when he comes back the accomplice says a sentence, perhaps something like this: "Uncle



3. Thought-reading with thirty-six cards



4. Division of the cards into groups

William likes green peas," or "Little Mary Smith lost her needle." These words indicate what card has been touched. This is a trick that may be repeated as often as you like; the more often it is done the more puzzling it becomes, and it is practically impossible to find the key for it.

What is the key or secret code used by the performers? They must suppose that the cards are divided into six groups of six cards in each group as indicated in picture 4. Then the names of the groups take the following order—man, woman, child, animal, vegetable, mineral. Picture 4 indicates the order of the groups. Then it is supposed that each group is divided in the same way, so that in each group there is a man card, a woman card, a child card, an animal card, a vegetable card, and a mineral card. Picture 5 indicates the names of the cards in each group. The sentence spoken by the accomplice must contain two nouns, the first noun indicating the group and the second noun indicating the card in the group. Thus "Uncle William likes green peas" means man group, vegetable card, so that the card is the second from the left hand in the second row from the back. "Little Mary Smith lost her needle" means child group and mineral card, so that in this case the card touched was the card at the extreme right of the second row from the back. "Our donkey loves baby" means animal group and child card, so that the card this time is the one third from the left of the second row from the front. Very little practice will give skill in this trick, which is one of the best for evening parties, as people ask for it to be repeated again and again, hoping that they may at last be so clever as to find out the secret.

5. Division of a group

HOW THE MILLER ARRANGED THE SACKS

On page 2139 is the problem of the miller and the sacks. This is the answer to it.

The way to arrange the sacks is as follows: 2, 78, 156, 39, 4. Here each pair when multiplied by its single neighbour makes the number in the middle, and only five of the sacks need be moved. There are only three other ways in which the sacks could have been rearranged; but any one of these would have demanded that more than five sacks should be moved.

THE PUZZLE OF THE WEAVER & THE CLOTH

A weaver had a piece of cloth which was embroidered in a very peculiar fashion with four lions and four castles, as shown in the picture. The four castles run from near the centre to the top right-hand corner, and the four lions run from near the centre to the top left-hand corner.

The task the weaver set his friends to do was to show how the cloth could be cut into four pieces, each piece being equal in size and shape, and each piece having a castle and a lion upon it. This seems a very difficult, perhaps an impossible, thing to do; but Mr. Henry E. Dudeney, in his "Canterbury Puzzles," shows how it may be done.

Remember that each piece must be equal in both size and shape, and each piece must have upon it both a lion and a castle, so that the four pieces are exactly alike. The solution of this problem requires patience and thought, but it is well worth the time and labour expended on it, and we shall feel quite proud of ourselves when we have found out the right way to cut the cloth.

THE NEXT THINGS TO MAKE AND THINGS TO DO ARE ON PAGE 2349

RAILWAYS IN CANADA

ENGLAND was the first country in the world to build railways. Although many people did not like them at first, because they were so different from the stage-coaches which they had known so long, yet in time even these people began to see that persons and goods could be carried much more quickly and cheaply by the iron horse than by the horse of flesh and blood. Canadians very much wanted to have railways of their own, especially when they saw their American friends following the example of the English. They felt that it would not do to have all the railways in this continent on the American side of the border, and they also felt that the people in the United States would take their trade from them if something were not done.

At that time most Canadians lived near the St. Lawrence River, the Great Lakes, or the Atlantic Ocean, but in winter the great river and the lakes were frozen so that boats could not sail over them. It is true that the ocean did not freeze, but it was hard for people and goods to reach it when there were no trains to carry them. The people living in Canada were so few and scattered that they hardly knew how to get the money which was needed to build the railways, nor were they sure the railways would be a success even if built.

However, the Government agreed to help, and several short bits of railway were built in Quebec and Ontario, and later in Nova Scotia and New Brunswick. These early lines were quite different from those we now know so well. The rails were made of wood, with strips of iron fastened on top, and the rails themselves rested on blocks of stone. The cars were small and uncomfortable, and the locomotives were much smaller than those we now have.

THE GRAND TRUNK RAILWAY

In 1852, a company was formed to build a long line of railway, and to take over most of the short lines which were then being worked. This company was called the Grand Trunk Railway Company, and most of the money which was needed was raised by Englishmen. It was intended that the railway should run from Windsor (in Ontario) to Toronto, Montreal, Portland (in Maine), Levis (opposite Quebec), and perhaps to the Maritime Provinces. Most of it was finished in a few years, but it did not go farther east than to Riviere du Loup. It crossed the St. Lawrence River at Montreal, where a very long bridge, called the Victoria Bridge, had to be built.

The Canadian Government gave a good deal of money to the company, but even with this help English people were very much disappointed when the railway failed to earn enough to pay them for their trouble.

There was still another reason in which you will perhaps be more interested. The rails on the Grand Trunk Railway were farther apart than they were on most of the American lines. In the United States the distance between the rails was generally 4 feet 8½ inches, but the distance between the rails of the Grand Trunk was 5½ feet. This had been done on purpose, so that in time of war the Americans could not run their trains over the Canadian railway, and so could not bring soldiers into the country. But in time of peace it made it very hard for goods and people to pass between Canada and the United States, and the Grand Trunk lost a good deal of business.

After several attempts were made to meet the trouble, it was decided to make the distance between the rails of the Grand Trunk the same as between the rails of the American railways. This was done in a few days, and then trains could easily pass from one country to another. Still later, the Grand Trunk started to build lines over a large part of Ontario, and also to Chicago and other American cities.

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THE GRAND TRUNK PACIFIC RAILWAY

So many people have been going to the Canadian West that in 1903 the Government decided that another railway must be built. They made a bargain with the Grand Trunk Railway to construct a line from Winnipeg to Prince Rupert on the Pacific Ocean. This new railway is called the Grand Trunk Pacific, and crosses the Rocky Mountains through the Yellowhead Pass. It is now (1913) nearly finished, and in a few more months trains will be running between Winnipeg and Prince Rupert. At the present time they go from Winnipeg through Edmonton to a point west of the Pass.

THE NATIONAL TRANSCONTINENTAL RAILWAY

This railway runs from Winnipeg east to Moncton in New Brunswick, and is being built by the Canadian Government. Most of it is already finished, and trains are being run over the completed parts. It will cross the St. Lawrence River at a point a little above the city of Quebec. The huge bridge which was being built there crashed into the river a few years ago, and many people were killed, but another and much stronger one is now being built. When this and the railway are finished, they are to be used by the Grand Trunk Pacific Railway, which will then be able to run trains from Moncton in the east to Prince Rupert in the west.

THE INTERCOLONIAL RAILWAY

Even before the Grand Trunk Railway was started, many Canadians thought that a railway should be built from some place in the Province of Quebec to the Atlantic Ocean. The shortest route through British territory seemed to be between the city of Quebec and St. Andrews in New Brunswick. At that time most Canadians thought that the land through which this railway would pass belonged to New Brunswick and Quebec. But the Americans said that most of it belonged to the State of Maine, and when the difficulty was settled, it was found that the proposed railway would pass over American territory. As a result, the plan was dropped.

During the American Civil War, Great Britain and the United States nearly came to blows because the Americans took two Confederates by force from a British ship. British troops were even ordered to go to Halifax, but every one saw that without a railway it would be very hard to get them to Quebec and Ontario, where they would probably be most needed. Fortunately, the quarrel was settled without a war, but it showed the English and Canadians that a railway must be built from the Maritime Provinces to Quebec.

The British refused to help unless it was built a good distance from the border of Maine, so that in case of war it could not be seized, but the people of New Brunswick wanted it to run through the valley of the St. John River, which would bring it very near the border. For a time the plan was dropped, and Nova Scotia and New Brunswick started to build short lines of their own.

When the Maritime Provinces agreed to join with Quebec and Ontario to form the Dominion of Canada, it was decided that the Intercolonial Railway should be built to connect Quebec with Halifax and St. John. This line was finished, with English help, in 1876. The part between Levis and Rivière du Loup, which had been built by the Grand Trunk, was bought by the Government. The railway followed the route which the English had asked for and which New Brunswick people did not want.

As a result, it is longer than one could wish, but it is far from American territory. It belongs to the Canadian Government, and now includes many more miles than it did in 1876. It runs from Halifax to Montreal, with branches to St. John and Sydney. The Canadian Government also owns all the railways in Prince Edward Island. In this little island province, the rails are only 3½ feet from each other, but they will soon be placed at the regulation distance.

THE CANADIAN PACIFIC RAILWAY

When the Dominion of Canada was formed in 1867, the country between Manitoba and British Columbia was uninhabited save by bands of Indians and a few white people, engaged, for the most part, in fur-trading. Even Manitoba, which became a province of the

SCENES ALONG THE SAME RAILWAY

These smiling fields remind one of an English landscape, but they were raw, unturned prairies only a few years ago. They are a part of the great experimental farm near Brandon, Manitoba, where different varieties of grains, fruits, vegetables and the like are tested to determine which are best adapted to Canadian conditions. The results of the tests have been of much value to Canadian farmers. The trees which line the broad avenue are young maples.

Photographs by courtesy of the Canadian Pacific Railway.

The scenery in the Canadian Rockies is hardly surpassed for beauty or grandeur anywhere in the world. This is The Gap, the entrance to the Rockies, where there is barely room for the train and the river to run side by side. Marvellous engineering skill has been shown in building the road through the mountains, which seemed to bar the way completely and to defy the efforts of the engineers. There is little chance for agriculture here.

Dominion in 1870, had very few inhabitants. The people of British Columbia said that they would join the Dominion if a railway were built to connect them with eastern Canada. The Dominion Government agreed, and promised that the line should be begun within two years and finished within ten. On these conditions British Columbia became a province of Canada in 1871.

The Dominion Government made a bargain with two companies to construct the railway. One of them was charged with paying money to the Government to help in the elections. The Government resigned, and in the election following was beaten, as most people believed that the charge was true. The next Government started to build the line, but failed. Then the old Government was re-elected in 1878, but it, too, failed in the attempt. Finally, in 1881, it made an agreement with the Canadian Pacific Railway Company to do the work. This company completed the task in a little more than four years.

The railway passes through the Kicking Horse Pass in the Rocky Mountains, and it also has an important branch which runs through the Crow's Nest Pass. Since 1885, a good many miles of line have been bought or built in Ontario, Quebec, New Brunswick and Nova Scotia, and also in the West.

The company also has a large fleet of steamers which ply between Great Britain, Europe and Canada, between Canada, Japan and China, on the Great Lakes, except in winter, and along the Atlantic and Pacific coasts. As a result, people may come to Canada from Great Britain, or Europe, in a Canadian Pacific steamer, travel through Canada in a Canadian Pacific train or boat, stay in their hotels, and continue to Japan or China in a Canadian Pacific steamer.

THE CANADIAN NORTHERN RAILWAY

The youngest of the great Canadian railways is the Canadian Northern. It was started in 1899, when a few short lines in Manitoba came under its control. Since then it has been extended from Port Arthur on Lake Superior to Edmonton in Alberta, with a great many branches in Manitoba, Alberta and Saskatchewan. Then there are the Canadian Northern Ontario Railway and the Canadian Northern Quebec Railway, both of which are parts of the same system. The company has also two lines in Nova Scotia, and at present is busy putting in the missing links, so that in a short time the Canadian Northern will have an unbroken line from Quebec and Montreal to Vancouver.

The western part, from Edmonton to Vancouver, will cross the Rocky Mountains through the Yellowhead Pass, and will be called the Canadian Northern Pacific Railway. It is also likely that the company will have connections with the Maritime Provinces. It needs them, because in the winter the Atlantic steamers stop at Halifax.

THE HUDSON BAY RAILWAY

One of the numerous branches of the Canadian Northern in Saskatchewan stops at a place called Le Pas, on the Saskatchewan River. The Dominion Government is now (1913) building a railway from this place to Port Nelson on Hudson Bay. This line is called the Hudson Bay Railway, and it is hoped that specially built and very strong steamers will be able to ply between Port Nelson and England during three or four months in the summer.

For many years the ships of the Hudson Bay Company have been able to do this, but it is a dangerous voyage even in the summer, on account of floating ice and snow-storms. The farmers in western Canada are very anxious that this railway should be finished as soon as possible. The amount of wheat which they produce has increased so much that the railways find it hard to haul it away to Montreal and other ports before winter begins and the St. Lawrence is frozen.

Most of it, too, is carried from Port Arthur or Fort William to a Georgian Bay port, or to Buffalo, in steamers, as it is much cheaper to do this than to take it all the way in trains. This produces a grand rush to get the wheat out before the lakes freeze, and it is hoped that the Hudson Bay Railway and boats will be able to take part of the crop, and even carry it more cheaply than is possible by any other route.

In 1901 Calgary had less than 5,000 inhabitants. In 1911 it was the largest city in Alberta, with a population of 43,655, and continues to grow very rapidly. It is the trading and supply centre for the mining, stock-raising and agricultural interests of the region, is an important station of the Hudson Bay Company, and contains workshops of the Canadian Pacific Railway. This view of Main Street shows the substantial character of the town.

Photographs by courtesy of the Canadian Pacific Railway.

The Canadian Pacific Railway, which owns much land along its lines, is constructing extensive irrigation works between Calgary and Medicine Hat, thereby transforming much land previously used chiefly for grazing into fruitful farms which will be very valuable. This picture shows the work of constructing an irrigation dam at Bassano, Alta., about half-way between Calgary and Medicine Hat.

SOME IMPOSING BUILDINGS IN OTTAWA

Picture by courtesy of the Grand Trunk Railway.

This interesting picture affords an unusual view of Ottawa. In the background to the left, beyond the Post Office are the Parliament Buildings. That part of the double bridge across the Rideau Canal, leading to the Parliament Buildings, is Dufferin Bridge, and the other part is Sappers Bridge. The Royal Alexandra Bridge across the Ottawa River may be seen in the distance, while nearer are the locks by which the Rideau Canal descends to the river. The magnificent Chateau Laurier Hotel, owned by the Grand Trunk Railway, is on the right, while a part of the new Grand Trunk Central Station is also shown.